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SALVAGING RUBBER FROM THE DEEP.

RECOVERING TREASURE FROM SUNKEN SHIPS has always been a fascinating theme for the romancers and the novelists, and yet it now promises to have its practical side. Among the millions of dollars of cargoes sunk by the Germans in their campaign of ruthlessness on the high seas were large consignments of rubber in both the crude and the manufactured state. It is pointed out that of all articles other than metals, rubber is best adapted to remain submerged for a considerable time and yet be serviceable when recovered. At last accounts, the British had succeeded in raising 210 ships and recovering a large percentage of the cargoes, despite the painstaking manner in which the Germans sunk them and endeavored to render them useless for all time.

Now that the salvagers can work without interruption in vicinities where the depth of water does not preclude such operations, there seems to be no reason why a large amount of sunken cargoes may not be brought to the surface intact. Entire ships have been raised, and a vast number were sunk in depths where it is very possible to recover their cargoes. It is even said to be feasible in the case of the *Lusitania*, which went down in 270 feet of water with immense amounts of valuables in her hold, although the ship itself will probably always remain where the marine murderers sent her.

JAPANESE RUBBER AMBITIONS.

THAT JAPANESE RUBBER MANUFACTURERS have been taking advantage of the situation created by the war is indicated by the activity which is displayed in all branches of the industry throughout the Flowery Kingdom. Their accessibility to the rubber plantations of the Far East has enabled them to secure raw material in sufficient quantities to put full steam ahead in manufacturing and the inventive, or imitative faculties of the Nipponese have been given abundant opportunity for development, as the list of inventions published in the current Japanese rubber periodicals indicate. The *"Gomu-Shimpo-Sha"* devotes several columns in each issue to inventions credited to enterprising citizens of the Mikado's realms, some of them, doubtless but improvements, or adaptations of American and English articles on the market, but their being put forth with the Japanese trade-mark is sufficient to give them more than an equal chance with the products of their Anglo-Saxon commercial rivals.

Automobiles are of course plentiful, but the pneumatic-tired jinrikisha is in evidence everywhere. The demand for jinrikisha pneumatic tires has been extraordinary, as the reports of the tire firms indicate. There is a healthy commercial rivalry between the rubber merchants and manufacturers of Osaka and those of Tokio. Some very interesting comments on the condition of the rubber industry in Japan are contained in "The Japanese Rubber World" under the caption "Peace and the Rubber Industry."

"It is a fact," says that paper, "that rubber manufacturing and the industry in general is progressing rapidly throughout Japan. We may congratulate ourselves that the trade is of an enduring character. The price of rubber articles is cheaper than similar articles fashioned of leather, fabric or wood, particularly in regard to clothing. Particular attention should be paid by Japanese business men and manufacturers to the rapid growth of the plantation rubber industry. Enterprises of this kind fostered by Japanese capital should be pushed with all speed. Rubber in the future is destined to take the place of many materials used in this kingdom and now that peace is at hand we should do all in our power to prepare for the conditions that will ensue with the establishment of peace. Having been on a war basis for so long, the world is unprepared for the peace situation. But the conditions in the rubber business are good and the prospects are excellent. A big change is destined to be wrought in the rubber business in the future. It is safe to say that it will take the surplus rubber supply of the world two years to replace the lack of the raw material in Germany and Austria caused by the war. Similar conditions exist in other parts of the world.

"While Europe has been fighting, we have been developing our rubber manufacturing industries. Our producers have easy access to the rubber plantations of the East and they have increased their products despite the British export duties."

GERMAN SYNTHETIC ASPHALT.

ANNOUNCEMENT has been made that Dr. Zimmer, the director of the A. G. Johannes Jeserich, at Charlottenburg, Germany, has worked out a process patented in all the principal countries for the production of synthetic asphalt which will render Germany independent of foreign sources of this material. A new company known as the *Gesellschaft Synthetischer Asphalt m. b. h.*, has been organized to exploit the invention and a factory is being erected at Velten near Berlin, but unsettled conditions in Germany render it uncertain when production will begin. The new invention may mean mineral rubber and open the field for a variety of plastics.

INDUSTRIAL TRAINING AND APPRENTICESHIP.

THE POLICY OF THE WAR DEPARTMENT in urging manufacturers, as a help toward relieving industrial unrest and reducing the high cost of living, to undertake industrial training for their workers while at the same time paying them a living wage during their period of apprenticeship, has much to commend it. Increased production is the greatest need of the day. That it means lower prices is axiomatic, and that it must come through greater individual efficiency is self-evident.

It is estimated that some 6,000,000 workers are required in American factories to do what 4,500,000 could do if well trained. This means that the average worker is only 75 per cent efficient. By intensive government training, thousands of unskilled men in many trades were turned into skilled workers in a short time during the war, and the same method will produce similar results under corporate management.

Industrial training is the logical way to improve the situation, and manufacturers are the proper persons to undertake it. This imposes a heavy initial expense on the part of employers, but leading firms in the metal, shoe and numerous other trades that have tried the experiment agree that it is a profitable investment. Usually the workers more than pay for themselves while learning. In the rubber industry the plan has given excellent results, especially in training women engaged in footwear, drug sundry, mechanical and sporting goods factories, and may well be more generally extended to work done by men.

Employers everywhere respond eagerly to a sound plan of industrial training because it gives them an opportunity for advancement in position, earning power and living conditions. Manufacturers begin to realize that it increases plant productivity in both quantity and quality through greater efficiency rather than expenditure; that it produces leaders to take charge of work requiring skill and intelligence, and makes for contentment among operating forces. They see that raising the level of skill and education of their workers is building the greatest future bulwark of American industry.

FADS IN INDUSTRY.

IT IS A CERTAIN SIGN OF PROGRESS that managers of industrial plants from time to time have tried out various systems for the purpose of increasing their output and improving the standard of both the workmen and managers. Perhaps some of them when subjected to close scrutiny might have been termed fads, but others have been productive of real good and there is reason for the belief that eventually a summary of these experiments will result in the adoption of a proved standardized system.

First came the epidemic of cost keeping. When this was at its height any reasonably intelligent clerk with a good address could get the job of installing a cost system. It lasted until managers of plants realized they were spending more time in ascertaining the costs of their work than in improving their production methods. Some of these systems survived, but many big plants in the country are managing to worry along without them.

Then came the efficiency slogan, which still prevails to some extent. Efficiency was heard from everywhere, and so-called efficiency experts went from factory to factory taking notes and promulgating theories. The keynote of the theories was: "If we could only make the workman efficient all would be well." It cannot be said that efficiency has been the cure-all, for despite the good it has undoubtedly done in some cases, industrial conditions in many parts of this country are deplorable. The Germans particularly devoted their energies to developing their workmen along lines of efficiency, being greatly assisted by the government which exercised strict control over many essential industries. It must be admitted that the Germans, previous to the war, had made considerable progress along these lines which was reflected by the standardized products of their factories.

Just now the owners and directors of plants are directing their attention to the improvement of the efficiency of those in control, for without efficient management it is shown that efficiency of workmen is relatively useless even if it is possible to get it. H. L. Gantt, a consulting management engineer of New York, in a recent address touched on the crux of this matter when he declared: "Our most serious trouble is incompetency in high places. As long as that remains uncorrected, no amount of efficiency in the workmen will avail very much. Can we find a measure, or even a correct indication, of that efficiency? I think we can, but we shall have to revise our methods of cost accounting, for those at present in vogue are not designed for that purpose."

Rubber—The One Normal Commodity.

By Henry C. Pearson, in "The Magazine of Wall Street."

FOR REASONS good and sufficient, all important commodities, with the single exception of india rubber, have doubled, trebled or quadrupled in price in the last four years. Why the apparent indifference of the great gum elastic industry to the high cost germ? It is thus explained:

The real beginning of crude rubber expansion was in 1876, when the British Government succeeded in establishing a small orchard of Pará rubber trees at Peradeniya Gardens, Heneratgoda, Ceylon. This was followed by the discovery of "wound response." In plain words this means that the Pará tree, the *Hevea*, can be milked daily, while other rubber trees and vines must rest after milking for months and even years.

With cheap and docile coolie labor it was soon found that plantation rubber could be produced cheaper and of as good quality as wild rubber. And numerous plantations in Ceylon, the Straits Settlements, Federated Malay States, Java and Sumatra were established. Just as the best of these came into bearing the automobile began its spectacular career. The demand for rubber became so great that from a normal price of $1.25 a pound it sold as high as $3 a pound. The dividends thus earned by the plantation companies, two and three hundred per cent, set English and to a lesser degree Dutch and Belgian investors aflame, and the "Rubber Craze" ensued.

HENRY C. PEARSON.

New companies were formed by the hundred and the jungles cleared and planted in record time. So great was the expansion that the 100,000 acres in existence in 1905 had expanded to nearly 2,000,000 acres at the outbreak of the Great War. And the world's annual production in that period grew from 62,000 tons to 120,000 tons. Nor did the plantations stop at that figure. In spite of the war the product for 1917 was 256,976 tons, or more than double in two years and increasing at about 50,000 tons a year. Thus it is apparent that there is plenty of rubber.

PRE-WAR CONDITIONS.

At the beginning of the war plantation rubber was low. The $1.25 rubber had given place to a 65 to 70-cent level, and it was to sink even lower. In spite of sporadic upward flurries it worked downward until 40 cents became the purchasing price. As the cost to the planter varies from 17 to 24 cents there was still a fair margin of profit, and the planters continued to sell. This in spite of frantic efforts on the part of planters' associations and hungry stockholders to restrict output, to valorize, to do anything to enhance the price.

Keeping pace with this increase in the output of crude rubber was the spectacular demand for pneumatic tires and tubes, for solid truck tires and an increased demand for all kinds of rubber goods.

In the light of such a market almost any merchants other than the far-sighted English would have held the customer up for higher prices. To be sure the big users were already possessed of big stocks, forward sales had been negotiated and there were vast supplies of reclaimed rubber available.

It was plainly seen that it was the part of wisdom to make it to America's advantage to buy in the Far East. For should that supply for any reason be withheld or fail, a very few years would suffice to install great plantations perhaps in Mindanao, Philippine Islands, where soil and climate are ideal, and plenty of seed available. Or the great American *Castilloa* plantations in Mexico, which were about to be replanted with Pará trees in the time of Diaz, might be suddenly available were present conditions reversed. If not there, perhaps in Guatemala, Honduras, Panama, Colombia, Venezuela or Brazil. With proper governmental guaranties from the countries named and a reasonable amount of sympathetic support from one's own government great planting projects could easily be installed. Indeed, they doubtless would be if the necessity arose.

Then there is the purely domestic experiment of "machine grown" rubber, right within our own borders and eventually taking its place with such enterprises as the cultivation of the sugar beet.

Then there are the extensive fonts of the Amazon and her mighty tributaries with a wealth of rubber trees, only the fringe of which has been touched. In the event of shortage the volume of rubber from Brazil, northern and southern, and from Bolivia and Peru would be increased enormously, and Africa, once the great rival of South America, would again figure as a big rubber producer. Furthermore, several of the great American companies have installed huge Pará rubber plantations of their own in the Far East. The constantly increasing product of three orchards, one of which is the largest in the world, and said to be the most economically administered, had a wonderfully steadying effect upon the market and was assailed by jingo papers as the "American invasion." Thus it was that the planters continued to produce and to sell, and in spite of lessend cargo space and the thousand and one handicaps of a great war the price of rubber continued low.

In the meantime the American rubber business grew and grew and at the time of the signing of the armistice we were using three times as much rubber as when the war began.

PRICES DECLINE.

With such a market for manufactured goods, even if the basic material be low, prices might well be high. But they became lower and lower during the first years of the war and with only two exceptions are still far lower than those of the other commodities.

One has only to study the accompanying Lubin graphs to see how remarkably low have been manufactured rubber goods.

Low priced crude rubber does not necessarily mean low priced rubber goods. The reason is rubber goods are built up of rubber, fabrics, compounding ingredients and labor. The rubber has been cheap but everything else entering into the finished product has shared in the great advance in price.

There are some 250 separate ingredients as solvents, fillers, vulcanizing ingredients, etc., regularly used by rubber manufacturers in rubber mixing processes. The prices of some went so high as to be prohibitive. Others disappeared from the market. All increased appreciably in price. A good instance is naphtha, which went from 13 cents to 24 cents and did not

recede. The same was true of the 50 or more types of fabrics upon which the trade was dependent. As for tools, machinery, building material, labor, all took part in the advance.

To offset this which for the moment looked like calamity there took place a rapid revolution of methods of manufacture that is one of the most remarkable incidents of a remarkable industry.

PRODUCTION SPEEDED UP.

The scarcity of skilled labor caused by the draft resulted in the invention of hundreds of machines that turned hand-made goods into machine-made and if anything bettered the product. Old machines were scrapped and everything that the best mechanical engineers could offer to speed up production was promptly adopted. Team work of man and machine was applied in all lines of manufacture.

The chemist was called upon to add his assistance. An elastic organic substance, rubber-like to a degree, of low cost, made from waste material, was so treated that it could be incorporated in the best rubber and actually added to its value. This in itself saved thousands of pounds of rubber. The time consumed in vulcanization was lessened by half by the use of catalyzers, that is by accelerators, or hasteners, so that there was a notable saving in steam and labor and an increase in production.

Speaking of time conserved in vulcanization: for years the great rubber shoe industry was handicapped by the so-called dry-heat cure requiring seven hours of slow baking. A revolution in this was wrought by the pressure cure, taking but a third of the time and incidentally allowing the use of a far wider range of compounds and producing a better product at a lower cost.

The great changes, mechanical and chemical, while apparently centering about the tire and footwear business, actually occurred in a notable degree in all lines of hard and soft rubber manufacture.

Working together the members of trade assured their supply of crude rubber from England by pledging themselves to purchase only for their own consumption. When war needs practically cut off their supply of zinc oxide, the notable tire toughener, they promptly substituted a toughening black that was useless in munition work. When cotton promised to be scarce certain of the big manufacturers planted thousands of acres of cotton and built gins by the score.

The labor situation in rubber, considering the general unrest, was handled with wisdom. Strikes were few and of brief duration. Manufacturers kept ahead of the H. C. of L., as far as their help was concerned, by successive increases of wages; by instituting factory stores, markets and war gardens and by providing housing facilities on a scale never before dreamed of. By piece work, bonuses, profit-sharing, premiums, pensions, insurance and hospitals, they made work profitable and the worker secure. Reading and recreation clubs were provided and a degree of friendliness and cooperation between employer and employe was the very definite and satisfactory result.

All of these efforts helped to keep the price of rubber goods down. In 1914, 1915 and 1916 rubber goods were on the average much lower than they were in 1913. In 1917 the constantly increasing cost of all materials except crude rubber brought prices up to the pre-war level. Since then there have been advances aggregating about one-third of the rise shown in "all other products." With it all the trade has prospered as never before and with no profiteering accusations made against it.

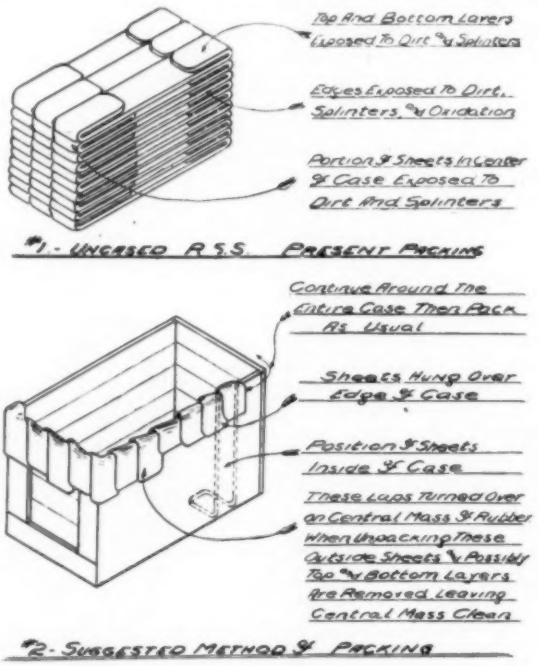
THE OUTLOOK.

As to the future there seems to be no need for uneasiness. The American industry, besides being the biggest in the world's rubber business, is by far the best equipped mechanically, chemically and in personnel.

It is, of course, dependent upon England and to a degree upon Holland for its raw product. England, however, never plays fast and loose with good customers, nor does Holland. Besides which we have cotton, a raw material that England needs as much as we need rubber. But beyond this is the ability of the industry to adapt itself to shortages without stopping and to provide for itself anything, anywhere, anytime.

A SUGGESTED METHOD OF PACKING SMOKED SHEETS.

Though the better plantations in the Far East use great care in packing ribbed smoked sheets, which is a standard grade of plantation rubber, still the consumer is obliged to wash the


Top And Bottom Layers Exposed To Dirt & Splinters
Edges Exposed To Dirt, Splinters, & Oxidation
Portion Of Sheets In Center Of Case Exposed To Dirt And Splinters
#1 - UNCASED R.S.S. PRESENT PACKING
Continue Around The Entire Case Then Pack As Usual
Sheets Hung Over Edge Of Case
Position Of Sheets Inside Of Case
These Laps Turned Over On Central Mass Of Rubber When Unpacking These Outside Sheets & Possibly Top & Bottom Layers Are Removed, Leaving Central Mass Clean
#2 - SUGGESTED METHOD OF PACKING

PRESENT AND SUGGESTED METHODS COMPARED.

rubber, or at least to inspect it carefully, because dirt sifts in and splinters from the wooden cases in which the sheets are packed get mixed with the rubber. A method of packing, shown in the accompanying cuts, has been devised by The Republic Rubber Corp., Youngstown, Ohio, which should keep the contents of the cases thoroughly clean and thus save tire manufacturers time and expense. The outer sheets are made to hang over the sides of the case, and when that has been packed full the laps are turned back over the rest of the contents.

RUBBER FINANCES IN MALAYA.

The Seaport (Selangor) Rubber Estate, whose plantations are in Klang and Kuala Lumpur in Malaya, reports that in the fiscal year 1918-1919 rubber amounting to 397,500 pounds was collected, a shade less than the year before. The cost of production f.o.b. at port of shipment was 18.84 cents a pound, against 20.665 cents in 1917-18. The net sale price was 40.864 cents a pound. The profits for the year were $95,973.71; out of these and those carried over from the year before a dividend of 12 per cent was paid out and the remainder, $66,101.08, was carried forward to the following year.

The total planted area of the estate is 1,969 acres, of which 184 acres, planted in 1917, are not yet in bearing; the remaining 1,785 rubber yielding acres were planted between 1905 and 1914. The crop for the year ending June 30, 1920, is estimated at 550,000 pounds.

The Effect of Organic Accelerators on the Vulcanization Coefficient.[1]

By D. F. Cranor.

A brief discussion of the already published work on the relationship of the mechanical properties of vulcanized rubber to the chemical composition, and a description of experiments with certain powerful accelerators which demonstrates that under certain conditions good mechanical properties can be obtained in rubber with a very low degree of chemical combination of sulphur.

DURING THE PAST FEW YEARS considerable material has been published regarding the relationship of the mechanical properties to the chemical composition of vulcanized rubber. It has been demonstrated that if vulcanization is carried to a point where maximum physical properties are obtained in the freshly cured goods, such goods are overvulcanized and subject to rapid deterioration; also, that the proper degree of vulcanization for soft rubber can be accomplished with less chemical combination of sulphur in the case of quick curing stocks, than with compounds which require prolonged heating to effect vulcanization. It is apparently quite generally believed that the coefficient of vulcanization for a properly cured pure gum mixing of good quality plantation *Hevea* rubber lies in the neighborhood of three, although it has been impossible to determine a coefficient which definitely represents the so-called optimum cure.

The fact that almost all practical rubber formulas to-day contain some one of the many organic accelerators makes further research necessary if scientific methods are to be applied to the estimation of the degree of cure of the mixings containing these substances. I have, therefore, undertaken extended work along these lines with view to making my testing methods more accurate and satisfactory. It has been the thought of the writer that results of greatest significance would be such as would indicate the amount of sulphur combination required to effect proper cure in a given sample of crude rubber, as compared with the combination necessary when the same rubber has added to it organic accelerators of various degrees of efficiency. Accordingly I have determined the physical properties and vulcanization coefficients of various samples of crude rubbers, when cured with and without accelerators, and have chosen certain series covering some of the results obtained in connection with powerful accelerators.

The determinations here described were made upon a mixing of standard ribbed smoked sheet and a sample of inferior brown plantation crêpe. In both cases 100 parts of rubber were mixed with 6 parts of sulphur and 1 of zinc oxide. The latter was included in order to have the compound workable to best advantage with accelerators which exert a maximum effect only when used in the presence of zinc oxide. The sulphur was set at 6 per cent on the weight of rubber, it being desired to use enough to get a stock capable of being overcured before showing the phenomena of reversion, which has been mentioned by Schidrowitz, and at the same time one in which the amount of sulphur is sufficiently low to obviate acceleration due to an excess, thus allowing the effect of the catalysts to be most clearly demonstrated. The percentage of zinc oxide is held at a minimum, it being used only to activate the accelerators added to these mixings. Even such an amount exerts a slight retarding action on the combination of sulphur, this having been proved by Van Heurn (See THE INDIA RUBBER WORLD, page 251, February 1, 1919), and also by personal experience in our laboratory. This substance is also a factor in fixing the physical properties of the product, but it is necessary to include it in the basic formula in order to preserve the similiarity of these mixtures with the treated compounds.

[1]Read before the Rubber Division of the American Chemical Society at Philadelphia, Pennsylvania, September 5, 1919.

It will be noted by referring to Table I that the smoked sheet was vulcanized through a wide range of time changes at a vulcanizing temperature of 292 degrees F., or approximately forty-five pounds' steam pressure. All test specimens were cut by a die from sheets approximately 0.100-inch thick, which were vulcanized in an ordinary platen press, the temperature of which was controlled by a reducing valve. The tensile strength, ultimate elongation and loads required to produce definite elongation were determined by a Scott vertical combination rubber-and-fabric testing machine, the pulling jaw of which travels at a uniform rate of 20 inches per minute. The tensile product was calculated according to the method of Stevens. "Set" was determined in the case of the results recorded in Table I by stretching the specimen from one to eight inches and holding at such elongation for a period of ten minutes. The measurements were made ten minutes after releasing the samples from the jaws of the stretching device.

In the following tables the samples used for the "set" test were also stretched to eight inches, except in series where the figures for ultimate elongation are less than one to nine, in which case the samples for "set" were stretched from one to seven inches. As a matter of fact, practically no value is to be attached to the "set" results, as in many cases the figures are identical for samples having otherwise widely vary characteristics. They are inserted only to make the results complete, since the test is one which seems to be much used in general testing practice. The coefficient of vulcanization has in every instance been calculated from a direct determination of combined sulphur, made upon a sample extracted in acetone for a period of 24 hours at the boiling temperature of the solvent. The method used is the nitrate acid-bromine oxidation followed by fusion with potassium nitrate in presence of sodium carbonate. Two determinations were made upon each sample, and in almost every case the results check to within 0.10 per cent.

TABLE I.

COMPOUND A. UNTREATED SMOKED SHEET. FRESHLY CURED SAMPLES TESTED 24 HOURS AFTER VULCANIZATION.

Minutes Curing at 292° F.	Tensile Strength Lbs. per sq. in.	Ultimate Elongation. Inches.	Tensile Product.	Load 700% E.	Load 800% E.	Sub. Perm. Set.	Coef. of Vulc.
85	1616	1 to 9.6	1492	583	1080	12.3	1.77
100	1646	9.6	1519	570	1230	12.5	1.95
115	1788	9.6	1650	680	1310	12.5	2.18
130	1856	9.6	1713	700	1330	12.5	2.85
145	2213	9.7	2064	739	1515	12.5	3.52
160	2133	9.5	1948	788	1500	12.5	4.08
175	2020	9.3	1806	883	1740	14.1	4.36
190	2313	9.6	2134	950	1840	15.6	4.76
205	2203	9.4	2000	1040	2100	9.4	5.07
220	2400	9.3	2146	1005	2010	Broke	5.25
235	120	4.5	52	Broke	Broke	Broke	5.47

It is seen with the smoked sheet that the series commences with a "heat" quite insufficient for proper vulcanization, and continues through 15 minutes' time changes to cover the entire range, including under, good and overvulcanization, and finally in the case of the last two members of the series, reversion and degradation due to overheating after the free sulphur content has been reduced to less than 1 per cent. This is especially

apparent in the 235-minute cure which has a strength of 120 pounds and an elongation of only 350 per cent or 1 to 4½ inches. If superior physical characteristics were to be taken as the vulcanization criteria, the 190-minute cure which shows the greatest tensile product, or the 205-minute which shows the greatest resistance to stretching, would be selected. However, the former has a vulcanization coefficient of 4.76, and the latter of 5.07, and the author is confident that any rubber man would pronounce these pieces to be overvulcanized after making the most superficial examination. Unfortunately, insufficient time has elapsed since the original preparation of the samples to publish the results of natural weathering tests at this time. But accelerated aging test, if applied to an entire series such as this, will show those members which are decidedly over or undercured, and the results of physical and chemical tests made upon specimens so treated are, therefore, given in Table II:

TABLE II.

COMPOUND A. UNTREATED SMOKED SHEET. ACCELERATED AGE RESULTS. TESTED 24 HOURS AFTER REMOVAL FROM HEATING OVEN.

Minutes Curing at 292° F.	Tensile Strength. Lbs. per sq. in.	Ultimate Elongation. Inches.	Tensile Product.	Load 700%-E.	Load 800%-E.	Sub. Perm. Set.	Coef. of Vulc.
100	1673	1 to 9.3	1495	818	1550	12.5	1.97
115	1943	9.1	1700	1100	1970	12.5	2.33
130	2283	9.0	1975	1435	2283	12.5	3.15
145	1807	8.2	1424	1740	Broke	13.5	3.69
160	1225	7.4	571	Broke	Broke	Broke	4.02
175	1378	7.2	954	Broke	Broke	Broke	4.39
190	1168	7.1	797	Broke	Broke	Broke	4.74
205	77	3.8	28	Broke	Broke	Broke	5.13
220	77	3.5	26	Broke	Broke	Broke	5.30
235	0	....	....	Broke	Broke	Broke	5.43

It is seen by the accelerated age test, that the sample cured 130 minutes, having original vulcanization coefficient of 2.85 (Table I), is the best of the series. It will be noted that this cure yields sample having a maximum strength, tensile product

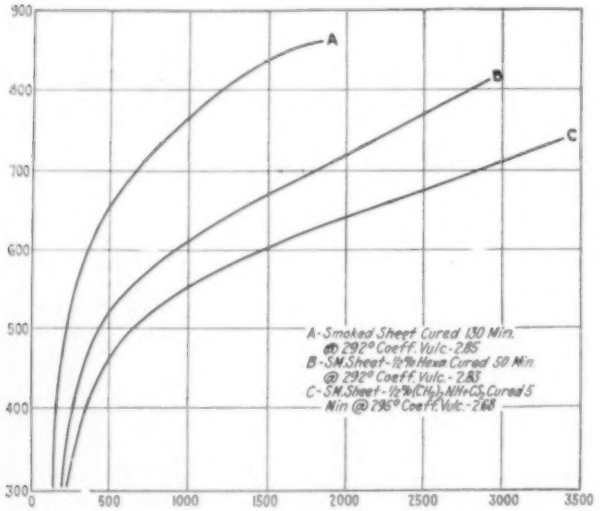


FIG. 1. STRESS-STRAIN CURVES.

and the greatest resistance to stretching after the accelerated aging treatment. The selection of this as the best cured sample is well in accordance with the conclusions of Stevens in a paper read before the Society of Chemical Industry. In this it was shown that first-grade plantation rubbers vulcanized to a sulphur combination of about three stood up well during an aging period of 120 weeks, whereas those cured to a greater degree deteriorated quite rapidly. This same figure has been indicated as the proper coefficient for a mixing of the nature in question by Spence, Kratz, Van Heurn and others.

Following the preparation and testing of the series above mentioned, the accelerators hexamethylene tetramine and dimethylammonium-dimethyl-dithiocarbamate (the addition product of dimethylamine and carbon bisulphide) were separately added to the original mixing, namely: smoked sheet 100 parts, sulphur 6 parts, zinc oxide 1 part, in the proportion of ½ of 1 per cent to the rubber contained in the batch. The former was selected as a moderately active accelerator and the other as an example of a group which probably comprises the most active accelerators known and, therefore, one of the most valuable for use in illustrating the extreme possible effects of accelerators on the mechanical and chemical properties of the resulting vulcanizates. This substance has been mentioned in the literature of rubber chemistry and should be a familiar one (see "Chemical Abstracts," January 10, 1918). The results in Table III show the effect of hexamethylene tetramine on the mixing.

TABLE III.

COMPOUND A. CONTAINING AN ADDITION OF ½ OF 1 PER CENT HEXAMETHYLENE TETRAMINE. SAMPLES TESTED 24 HOURS AFTER VULCANIZATION.

Minutes Curing at 292° F.	Tensile Strength Lbs. per sq. in.	Ultimate Elongation. Inches.	Tensile Product.	Load 600%-E.	Load 700%-E.	Load 800%-E.	Sub. Perm. Set.	Coef. of Vulc.
30	1970	1 to 9.6	1818	400	830	1630	9.4	1.50
40	2330	9.4	2286	600	1160	2170	12.5	1.99
50	2900	9.1	2537	935	2070	2850	18.7	2.83
60	3015	9.1	2686	870	1780	2860	15.6	3.62
70	2580	9.3	2307	580	1110	2380	9.4	4.23
80	2340	9.4	2115	495	1000	2050	7.8	4.82

It is apparent from these figures that the compound containing this substance not only cures in about one-third the time required for vulcanization of the untreated rubber in the same formula, but the relationship of mechanical properties to chemical composition is altogether altered. If we refer the physical properties to the vulcanization coefficient as standard, by comparing the 50-minute cure with coefficient of 2.85 with the 130-minute "correct" cure of the untreated smoked sheet with coefficient of 2.85, it is seen that the "hexa" stock has 1,044 pounds per square inch greater tensile strength, one-half inch less stretch, a tensile product higher by 824, and that more than twice the load is required to stretch this stock to a given elongation. Making allowance for the toughening effect of the accelerator, the "hexa" compound is somewhat overvulcanized at the 50-minute cure.

In Table IV are indicated the results obtained by using the dimethylamine addition product at a vulcanizing temperature of 292 degrees F.

TABLE IV.

COMPOUND A. CONTAINING IN ADDITION ½ OF 1 PER CENT DIMETHYLAMMONIUM-DIMETHYL-DITHIOCARBAMATE (THE ADDITION PRODUCT OF DIMETHYLAMINE AND CARBON BISULPHIDE). SAMPLES TESTED 24 HOURS AFTER VULCANIZATION.

Minutes Curing at 292° F.	Tensile Strength Lbs. per sq. in.	Ultimate Elongation. Inches	Tensile Product.	Load 600%-E.	Load 700%-E.	Load 800%-E.	Sub. Perm. Set.	Coef. of Vulc.
1	1680	1 to 9.6	1530	375	725	1300	9.4	0.57
2	2340	9.6	2160	430	880	1675	9.4	0.77
3	2418	9.2	2140	582	1195	2207	9.4	1.09
4	2691	9.2	2303	600	1225	2398	9.4	1.21
5	2698	9.1	2303	655	1365	2508	9.4	1.45

In this instance it is seen that samples having satisfactory physical properties were obtained in vulcanizing periods of three, four and five minutes with the abnormally low coefficients of 1.09, 1.21 and 1.45, respectively. The same mixture was also vulcanized at 295 degrees F., the results being given in Table V:

TABLE V.

SAME STOCK AS REPORTED IN TABLE IV CURED AT HIGHER TEMPERATURE. SAMPLES TESTED 24 HOURS AFTER VULCANIZATION.

Minutes Curing at 295° F.	Tensile Strength, Lbs. per sq. in.	Ultimate Elongation, Inches.	Tensile Product.	Load 600%-E.	Load 700%-E.	Sub. Perm. Set.	Coef. of Vulc.
1	2760	1 to 9.2	2494	710	1490	9.4	1.10
2	3330	8.9	2850	1060	2330	9.4	1.59
3	3372	8.4	2723	1500	2930	9.4	2.15
5	3410	8.4	2734	1460	2910	12.5	2.68

Note—The greater degree of cure of this series as compared to that cured at 292 degrees can hardly be entirely attributed to the slight increase in temperature. It is probable that the raw stock was heated to a greater degree in the course of mixing.

In this series, the sample cured five minutes (coefficient 2.68) closely approaches the 2.85 coefficient of the correctly cured standard smoked sheet. Comparing the physical characteristics of these two, we find a difference of 1,554 pounds tensile strength in favor of the accelerated stock, a loss of 1.2 inches in elongation at the breaking point, a tensile product higher by 1,021, and an even greater resistance to stretching than in the case of the rubber containing hexamethylene tetramine. This sample is undoubtedly much overvulcanized.

Figure 1 shows the stress-strain curves of the three samples, all taken from the same lot of rubber and all cured to vulcanization coefficients of 2.68 to 2.85 by means of vulcanizing periods, ranging from five minutes to two hours and ten minutes. It affords a graphic illustration of the variation in physical properties referred to essentially the same vulcanization coefficient.

Figure 2, on the other hand, illustrates the range of the vulcanization coefficients for the same samples, referred to the load required to produce a uniform elongation of 700 per cent. By reference to these curves, we find that about 4.9 per cent of combined sulphur is necessary to produce a sample of untreated rubber requiring a load of 1,000 pounds to stretch it through 700 per cent. In the case of the same rubber containing an addition of ½ of one per cent of "hexa," the same effect was produced when about 1.8 per cent of sulphur has been combined. With the introduction of the dimethylamine addition product, the corresponding coefficient drops to 0.9 per cent. Figure 2 also includes a curve representing the compound reported in Table VI, which consists of the basic formula and 1 per cent of the dimethylammonium-dimethyl-dithiocarbamate.

TABLE VI.

COMPOUND A. RIBBED SMOKED SHEET, 5 PER CENT SULPHUR AND 1 PER CENT ZINC OXIDE, TO WHICH HAS BEEN ADDED 1 PER CENT OF DIMETHYLAMMONIUM-DIMETHYL-DITHIOCARBAMATE. STOCKS CALENDERED AND STORED BETWEEN SHEETS OF HOLLAND CLOTH AT ROOM TEMPERATURE. RANGE ABOUT 70 TO 90 DEGREES F.

Vulc. Cond. Room Temp.	Tensile Strength. lbs. per sq. in.	Ultimate Elongation. Inches.	Load at 600%—E.	Load at 700%—E.	Coef. of Vulc.
33 days' storage	*2090	1 to 8.4	810	1610	0.77
2 months' storage	†2458	1 to 8.5	740	1700	1.05
33 days' storage	‡2290	1 to 9.4	740	1040	0.77
2 months' storage	§2266	1 to 8.6	705	1625	1.05

*Sample cut with the grain.
†Sample cut with the grain.
‡Sample cut across the grain.
§Sample cut across the grain.

These samples were not heated at all, being mixed, calendered and stored in the dark between sheets or holland cloth. The tests shown were made one month and two months after preparation, and certainly show that spontaneous vulcanization has taken place to a very considerable extent. With this mixing we find, by extending the curve toward the zero point, that this unheated material would require the load of 1,000 pounds to stretch it to 700 per cent when only 0.7 per cent of sulphur has entered into combination with the rubber. The general tendency is for the curves to flatten toward the load axis as the period of heating is reduced, and this gives some indication of the extent to which rubber is depolymerized by heat and shows that extremely low sulphur combination is sufficient to vulcanize when the period of heating is reduced to a minimum or entirely omitted. The turn of the curve representing the untreated rubber in the neighborhood of the 5 per cent combined sulphur line again illustrated the reversion which takes place when heating is continued after the bulk of the sulphur has entered into combination. The turn at the 3 per cent point, in the case of the "hexa" sample is indicative of the great care necessary when

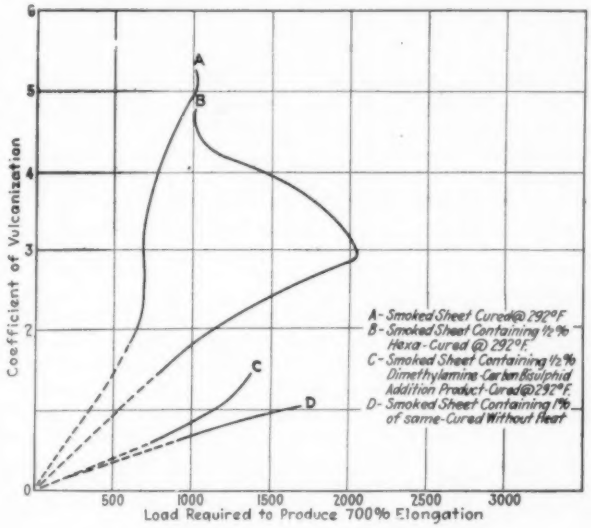

Coefficient of Vulcanization
Load Required to Produce 700% Elongation
A- Smoked Sheet Cured@292°F.
B- Smoked Sheet Containing ½% Hexa-Cured @ 292°F.
C- Smoked Sheet Containing ½% Dimethylamine-Carbon Bisulphid Addition Product-Cured@292°F.
D- Smoked Sheet Containing 1% of same-Cured Without Heat

Fig. 2. RANGE OF VULCANIZATION COEFFICIENT.

using this substance, since if the sulphur in the compound is held down to a figure which is too low, results equally as disastrous as those coming from overcure will inevitably follow the overheating of such compounds.

Work along very similar lines was also carried out with an inferior type of brown plantation crêpe, the results of which are indicated in Tables VII and VIII:

TABLE VII.

COMPOUND A, IN WHICH INFERIOR BROWN PLANTATION CREPE IS SUBSTITUTED FOR STANARD RIBBED SMOKED SHEET. SAMPLES TESTED 24 HOURS AFTER VULCANIZATION.

Minutes Curing at 292°F.	Tensile Strength. Lbs. per sq. in.	Ultimate Elongation. Inches.	Tensile Product.	Load 600%-E.	Load 700%-E.	Sub. Perm. Set.	Coef. of Vulc.
120	630	1 to 8.5	515	330	515	9.4	2.72
240	943	8.4	752	423	800	6.3	3.45
300	785	7.0	528	785	Broke	4.2	4.61

TABLE VIII.

SAME STOCK AS REPORTED IN TABLE VII WITH ADDITION OF ¾ OF 1 PER CENT DIMETHLAMMONIUM-DIMETHYL-DITHIOCARPAMATE. SAMPLES TESTED 24 AFTER VULCANIZATION.

Minutes Curing at 292°F.	Tensile Strength. Lbs. per sq. in.	Ultimate Elongation. Inches.	Tensile Product.	Load 600%-E.	Load 700%-E.	Sub. Perm. Set.	Coef. of Vulc.
1	1520	1 to 8.5	1242	680	1195	12.5	....
2	2480	8.7	2074	943	1745	9.4	1.18
3	2820	8.4	2278	1383	2510	12.5	1.73
4	2900	8.3	2314	1406	2530	10.9	2.03
5	3337	8.5	2727	1420	2600	18.7	2.24
8	3000	8.5	2480	1122	2220	10.9	2.77

In this case, the figures reported are limited to the tests made on the straight rubber and the same rubber to which was added ¾ of 1 per cent of the dimethylamine-carbon bisulphide addition product. Preliminary tests on this rubber treated with hexamethylene tetramine showed that satisfactory vulcanization could only be obtained with the addition of higher proportions of zinc oxide. Figure 3 shows the complete stress-strain curves

of 120, 180, 240 and 300-minute cures at 292 degrees F. on the rubber with 6 per cent sulphur and 1 per cent zinc oxide, these being represented by the dotted line curves A, B, C and D, respectively. On the same graph there is also indicated the stress-strain curves corresponding to 1, 2, 3, 4 and 5-minute cures at 292 degrees F. in case of the same mixing containing a ¾ of one per cent addition to the powerful catalyst, these being the solid lines E, F, G, H, J and K, respectively. Addition of ½ and ⅝ of 1 per cent were not sufficient to produce good vulcanization at a temperature of 292 degrees in periods ranging from 2 to 5 minutes. These results are in general similar to those obtained by adding the accelerator to the smoked sheet, but are more notable, inasmuch as the brown crêpe was altogether incapable of being well vulcanized in its natural state, whereas through the use of the accelerator, samples having good physical properties are produced in extremely short vulcanizing periods.

It is to be noticed that the sample in Table VI cured 240 minutes and represented by Curve C in Figure 3, has all the characteristics of a technically undercured sample, although the coefficient amounts to 3.45, which is well above the 3 per cent limit mentioned for first-grade rubbers. On the other hand, the sample cured for 300 minutes is undoubtedly both overcured and overheated. The best cure would, therefore, fall between these points, but it is evident that no good cure is possible with this rubber except through treatment with chemical accelerating agents.

Although more results would be required before any definite conclusions should be drawn, the writer would summarize as follows:

SUMMARY.

(1) Although average good quality plantation *Hevea* rubbers may require a combination of sulphur of about 3 per cent to effect the proper or optimum cure, such rubbers can be vulcanized in a small fraction of the original time through the use of very powerful catalysts, together with zinc oxide, in which case excellent physical properties are obtained in samples, the vulcanization coefficient of which may be in the neighborhood of one.

(2) Inferior types of plantation rubbers which are incapable of being transformed into satisfactory vulcanizates through the agency of sulphur alone may be readily vulcanized in very short curing periods and at normal vulcanizing temperatures through the use of powerful accelerators in the presence of small quantities of oxide of zinc. Although such rubbers may be undervulcanized when as much as 3½ per cent of sulphur is brought into combination through prolonged heating, good mechanical properties may be found in samples having abnormally low vulcanization coefficients when the vulcanization is carried out with minimum heating through the use of powerful accelerators.

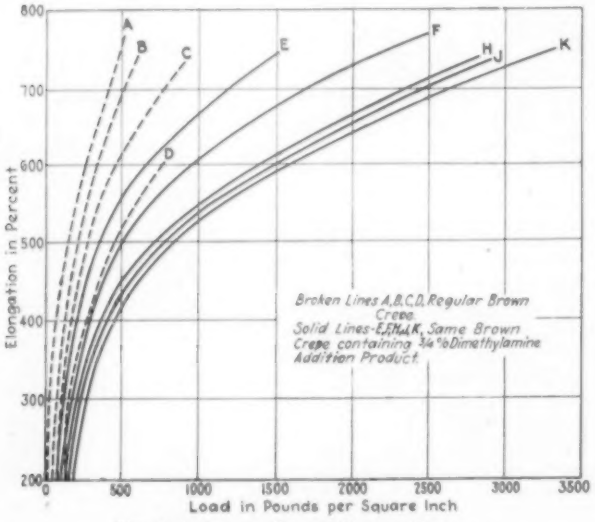


Fig. 3. COMPLETE STRESS-STRAIN CURVES.

(3) No definite figure can be established for the vulcanization coefficient of properly vulcanized soft rubber goods in general, or for the optimum cure of any mixing in particular, for the reason that the mechanical properties, as well as the chemical combination of sulphur is influenced by the time and degree of temperature used for vulcanizing.

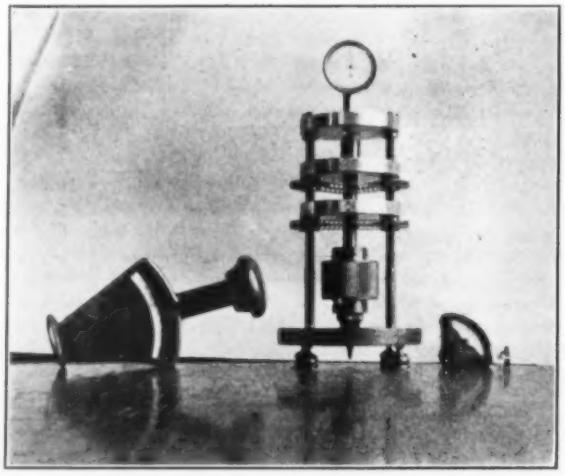
(4) It would appear probable, however, that in the case of any definite compound, the vulcanizing conditions could be standardized by the use of an accelerator, and that the degree of vulcanization could then be checked most accurately through determinations of the coefficient of vulcanization.

SOME METHODS OF TESTING THE HARDNESS OF VULCANIZED RUBBER.[1]

By H. P. Gurney.

USUAL QUALITATIVE METHODS.

THE MOST NATURAL WAY for an experienced rubber man to estimate the hardness of a piece of cured rubber is to note the force required to indent it with the point of a pencil or similarly convenient means. Although practical rubber workers are thus able to distinguish very accurately between different grades of rubber coverings, the information acquired is of no value as a matter of record since it cannot be designated quantitatively.



DENSIMETER. PLASTOMETER. DUROMETER.

QUANTITATIVE METHODS.

SPRING TYPE APPARATUS. The use of any of these different instruments for obtaining a figure expressing the hardness of rubber surfaces affords an accurate method for the comparison and recording of the quality of hardness by an arbitrarily chosen number.

In instruments of the spring type, the force is applied by means of a spring and the rubber is indented by a point of specified shape and dimensions.

The Durometer is an extremely convenient pocket instrument of this class. On its scale the hardness of glass or steel registers 100, while that of soft rubber good may register as low as 40.

At the Boston Belting Corp.'s factory, a so-called "Densimeter" has been in use for many years. This instrument is also of the spring type. A perfectly hard object has a densimeter reading of 1000, while softer objects may run as low as 250. There is one marked disadvantage in the use of the spring type of hard-

[1] Read before the Rubber Division of the American Chemical Society, at the Philadelphia meeting, September 2-6, 1919.

ness testers; namely, the existence of a noticeable variation in results due to the personal element.

DEAD WEIGHT TYPE APPARATUS. The Plastometer is an instrument of this type in which the penetration by a steel ball, of ⅛ or ¼-inch diameter, under a load of one kilogram, is read in 1/100ths of a millimeter. Owing to the fact that the downward force of the indicating dial rod is 85 grams, the depression measured is not that due to an increase of load from 0 to 1000 grams but to an increase from 85 to 1085 grams.

In the practical use of this instrument, it is recommended by the makers that the readings be taken after one minute. The advisability of observing this time element is seen when it is noted that the initial reading is about 5 per cent lower than the reading found after the lapse of 60 seconds. The reading at 20 seconds is 2 per cent lower and that at 40 seconds 0.6 per cent lower than the reading at 60 seconds.

HARDNESS AND ITS RELATION TO THE MODULUS OF ELASTICITY.

In order to get an insight into the nature of hardness, it was arranged to measure the actual depression into rubber valve samples using both the ¼ and the ⅛-inch balls of the Plastometer. This was measured in terms of the volume displaced and the force of depression. Two samples were taken, one of 40 and the other of 110 plastometer.

When charted, we find that the force-depression volume plots are nearly straight lines and are approximately the same regardless of the size of the ball used. The fact that the reading on one instrument does not always correspond exactly with a certain reading on another, but holds true within certain limits only, is probably explained by the fact that the plots are not straight lines but are really slightly curved upward and at slightly different rates.

Hardness may be defined as the ratio of force to volume of depression and would have dimensions—

$$\frac{\text{Mass}}{(\text{Length})^2 \quad (\text{Time})^2}$$

The modulus of elasticity, which is sometimes used to measure the hardness of vulcanized rubber, is usually defined as the stress required to double the length of a rubber sample. It is so defined because the ratio of stress to strain is not uniform, although occasionally assumed as such for computation purposes, as with airplane shock absorbers.

The dimensions of the modulus of elasticity are—

$$\frac{\text{Mass}}{(\text{Length}) \quad (\text{Time})^2};$$

hence it varies from the dimensions of hardness by the inverse of the dimension of length.

The value of the use of an absolute or rational measure of hardness would not necessarily involve a different instrument for testing. The figures obtained with the present instruments could be expressed in terms of any convenient units, such as pounds per cubic inch, kilograms per cubic centimeter, or dynes per cubic centimeter.

The Runge Solution Process for Rubber Reclaiming.

Special Correspondence.

THE RUNCE-WERKE AKTIENGESELLSCHAFT (Runge Works Corporation) in Spandau, which up to the beginning of 1917 was Max Fränkel and Runge, the largest German rubber reclaiming factory, has just made public some very interesting facts concerning reclaiming by the solution process.

ALKALI AND SOLUTION PROCESSES.

First, however, a few words about the German preparation of reclaimed rubbers. Among the many processes the most important at present are the so-called alkali process and the solution process. In the alkali process the fiber contents of the rubber waste are removed by being converted through the action of the alkali into a substance that is soluble in water, while the mass of rubber itself remains undissolved. In the solution process, on the contrary, the fibrous contents remain undissolved, while the mass of rubber is dissolved by the solvent employed, leaving a rubber solution from which, after reextracting the solvent, the mass of rubber is separated.

GERMAN RECLAIMED RUBBER CONSUMPTION.

The consumption of crude rubber in Germany in 1913 was over 20,000 tons. There are no statistics for the consumption of reclaimed rubbers; it was relatively small and may be estimated at something like 6,000 tons. A slight proportion of this German consumption of reclaimed rubber was made up of the rubber waste which was reclaimed in the rubber factories themselves and then made into rubber goods.

By far the greater part of the reclaimed rubber worked up in Germany in the peace period that preceded the war was imported from foreign countries, especially the United States and England. The chief reason for the slight consumption of reclaimed rubber in Germany before the war was that even in professional circles reclaimed rubbers were not looked upon as real rubber material, but only as substitutes which must be used only with the greatest possible secrecy.

RECLAIMING INDUSTRY STIMULATED BY THE WAR.

Conditions during the war gave for reclaimed rubbers a wholly different value, for after the blockade instituted by the English the war management very soon was compelled to make use of reclaimed rubbers to an extent which every person in the business would previously have thought impossible, and which was also not affected by the production of synthetic rubbers. What was impossible in peace times was learned from the war, namely, the extraordinary adaptability of reclaimed rubber to many purposes.

The German industries that worked in rubber learned that they must give full weight to the facts that reclaimed rubbers are already a mixture of rubber and additional materials, that they contain the rubber in a vulcanized form, and that the methods of treating them in manufacturing must be different from those employed with crude rubber.

PRODUCTION OF THE RUNGE WORKS.

The reclaimed rubber production of the Runge works, reached before the war the record amount of 1,850,750 pounds in 1912 and then dropped to 1,090,432 pounds in 1914.

In the ensuing war years the output developed as follows:

	Pounds.
1915	1,433,275
1916	1,692,552
1917	1,958,877
1918	2,142,577

In the course of the war nearly all German users of rubber became favorable to the products of the establishment, so that the total production of reclaimed rubber increased steadily in spite of the fact that in the course of the later years of the war the supplies of rubber waste became smaller and smaller and had led to rapidly increasing limitations on the general use of reclaimed rubber. In 1918 the reclaimed rubber production of the Runge works amounted to over two million pounds and the returns on account of the rise in prices were roughly $1,666,000. The firm, too, was greatly hampered at times in its production by prohibitions against the use of certain materials, for instance, by the Imperial Navy Office with regard to the solution reclaimed rubber for ocean cables, and so on. Nevertheless in the future course

of the war the Navy Department not only became the greatest user of solution reclaimed rubbers, but admitted their advantages without reservation.

NEW USES FOR SOLUTION RECLAIM.

This so-called solution process, a novel process for the utilization of rubber waste, the Runge works was the first to bring into use, not merely in Germany, but in the world. The process yields by-products which in turn make it possible to employ new methods of working in the manufacture of rubber products. The Runge firm had, even before the war broke out, obtained the patent rights for a series of processes which offer not merely the possibility but the probability of introducing revolutionary innovations in branches of industry which are remote from the rubber industry, and which before the war were not taken into consideration at all as users of rubber. The scarcity of rubber brought on by the war made it impossible to develop the possible applications of these productions of the firm. But in the coming days of peace the overproduction of the rubber plantations leads to the expectation of ample provision for the German rubber market, whether in the form of crude rubber or of rubber waste, while other industries will have to contend with a continuous marked deficiency in the raw material that must be imported from foreign lands.

The prospects for the solution reclaimed rubbers making good are much more favorable than they were before the war. The matter is one which affects especially the processes for the production of proofed fabrics, also linoleum-like flooring and other necessaries for the building trade. The textile and linoleum industries are precisely the branches of industry which in the approaching days of peace for Germany will have to suffer greatly from the lack of raw materials.

THE FUTURE OF RECLAIMED RUBBER.

In the opinion of the Runge works, Germany's consumption of reclaimed rubber in the coming peace time will be uncommonly great. If German economic experience with the employment of reclaimed rubber, acquired during the war, is fully utilized, the production of a given quantity of rubber goods will require only half as much raw rubber as in the peace period preceding the war, and the other half of the rubber will be supplied by reclaimed rubbers, while the excellence of the product need not be in any way inferior to that of the earlier peace goods.

A natural prerequisite is that not only must rubber waste not be exported, but it must also be imported. If for example, in the preceding peace time the largest German rubber goods factory exported to England 8,800,000 pounds weight of worn out automobile covers and received back in return 4,400,000 pounds of reclaimed rubber, such a procedure will hardly conform to the economic requirements of Germany.

It is the belief at the Runge works that in the future German economic life and the rubber reclaiming industry will have a marked development.

SOLUTION RECLAIMING PROCESSES.

There are many reclaiming solution processes, several being of other than German origin.

HEYL-DIA PROCESS (BRITISH). By this process ground rubber is heated under moderate pressure in naphtha at a temperature of not more than 120 degrees F. The naphtha is drawn off and with it most of the sulphur. The rubber is then heated to over 350 degrees F. with a fresh solvent, when it dissolves. The solvent is then removed and the sulphur washed and dried.

THE BASLE PROCESS (SWISS). This covers the use of various ethers boiling at a temperature of about 100 degrees C.

ZÜHL PROCESS (GERMAN). Vulcanized waste is dissolved in five times its weight of naphthalene at a low temperature. The naphthalene is then distilled from the mixture with steam.

KOENER'S PROCESS (GERMAN). Waste rubber is heated with solvents such as benzene for a time, after which the solution is further heated with water and the solvent subsequently distilled off.

DEBAUGE PROCESS (FRENCH). Tires are soaked for two or three days in xylol or other solvent, when the fabric can easily be stripped away from the rubber. The rubber attached to the fabric layers can be removed by a revolving wire brush, or by digestion in vacuum with boiling xylol. The rubber is ground while in the brittle, swollen condition produced by the solvent, and the latter recovered from the rubber and fabric by steam or dry distillation, in the latter case under reduced pressure. The solvent may also be removed by washing with acetone or alcohol.

O'NEILL PROCESS (AMERICAN). The caoutchouc is dissolved out from vulcanized waste rubber by treating the waste in a closed receptacle under about 60 pounds' pressure at a temperature below that determined to the rubber product (266 degrees F.) in the presence of boiling resin spirit. The solvent is removed from the dissolved and devulcanized rubber by vaporation. The product is said to have all the characteristics of the original rubber compound before vulcanization.

DE VILLERS PROCESS (FRENCH). Rubber-coated waste fabric is treated with boiling hot tetrachloride of ethane in two stages. The free sulphur is removed by a brief treatment and the solution of the rubber is accomplished by a second extraction with fresh solvent. After removing the fabric, the rubber is recovered from the solution by adding water and distilling off the solvent with water; or the solvent may be distilled dry, provided care be taken not to overheat the rubber.

COMPAGNIE GÉNÉRALE DES CAOUTCHOUCS DE TEREBENTHINE PROCESS (FRENCH, CANADIAN AND SWISS PATENTS). Rubber is recovered from rubbered fabrics by treatment with ethane tetrachloride, heating the fabrics during this treatment, filtering the resulting mass to remove the fabric, adding water to the filtrate and heating it to drive off the water and solvent.

GOLDMAN PROCESS (AMERICAN). Rubber stock is recovered from vulcanized rubber by bringing the latter in contact with a solution comprising resin and a material obtained by the action of dissolved resin on vulcanized rubber, and incorporating this solution with the comminuted vulcanized rubber and removing the solvent therefrom.

COX PROCESS (AMERICAN). Rubber stock is recovered from vulcanized rubber by treatment in a resin solution together with a solution of vulcanized gum in a resin solution.

PORZEL PROCESS (AMERICAN). Rubber waste is finely ground and mixed with a rubber solution in the proportion of 2½ to 3 pounds of new rubber to each hundred of old, the solvent being gasoline or carbon tetrachloride. The mass is reground, after which the solvent and any contained moisture are removed as far as possible, the temperature being kept below the vulcanizing point, employing a partial vacuum if necessary. Molding and vulcanization are affected with or without the addition of sulphur, which, when employed, is preferably dissolved in the rubber solvent.

HARRIS PROCESS (GERMAN). Ground rubber scrap is heated with a solvent such as chloroform, carbon tetrachloride, benzol, etc., the inorganic matter is separated and the solution is treated with hydrochloric acid, rubber hydrochloride is formed and is either filtered off directly or is precipitated with alcohol or chloroform in a vacuum. After washing with alcohol, ether, or chloroform the rubber hydrohalogenide is heated with pyridin under a reflux condenser for 12 to 50 hours and the dark solution is poured into water and the regenerated rubber separates. (German patents No. 267,277, November 28, 1912; No. 267,993, December 29, 1912; and No. 267,994, January 21, 1914.)

HUTZ PROCESS (GERMAN). This consists in reclaiming vulcanized rubber scrap by treating it with hydrochlorines or the intermediate products obtained by the action of muriatic acid on glycerine. (German patent No. 268,843, December 24, 1912.)

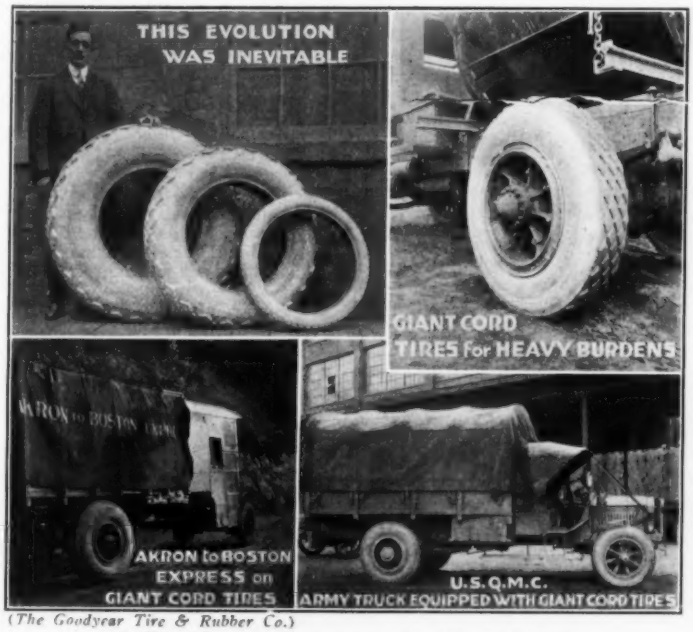
Giant Cord Tires for Motor Trucks.

IN MANY RESPECTS the introduction of the motor truck has been not unlike that of the steam locomotive, some 90 years ago. When the locomotive was ushered into a wondering and incredulous world its sponsors entertained fanciful visions of its future importance while the "iron horse" was still little more than a giant toy. Road conditions prohibited its use. Then followed a period during which the steel track was perfected. First, the rails were of hardwood strips, then ribbons of iron were replaced on these wooden rails, next all-iron rails were substituted, and eventually the heavy steel rail of to-day.

The adaptation of the motor truck to present-day traffic uses has been accomplished by conquering just such trying conditions as those which confronted the locomotive promoters of nearly a century ago. Gasoline makes the giant truck go, but without a suitable "track"; namely, suitable tires, its commercial or industrial advantages remain quite limited.

The first motor trucks were fitted with solid rubber tires since at that time no other tires were available. But they were far from satisfactory for every purpose. Overloading was the common cause of failure, while their inability to negotiate bad roads set decided limits to their utility.

Interested manufacturers began at once to develop tires that would permit the motor truck to branch out into broader fields of service. The advantages of pneumatic had long been demonstrated on the passenger car and the plausibility of this equipment for the commercial truck was the first thing to be investigated.


THIS EVOLUTION WAS INEVITABLE
GIANT CORD TIRES for HEAVY BURDENS
AKRON to BOSTON EXPRESS on GIANT CORD TIRES
U.S.Q.M.C. ARMY TRUCK EQUIPPED WITH GIANT CORD TIRES

(The Goodyear Tire & Rubber Co.)

A NEW ERA FOR PNEUMATIC CORD TRUCK TIRES.

SPECTACULAR INTRODUCTION OF PNEUMATICS.

In the early spring of 1917, just before the entrance of the United States into the war, a motor truck service was inaugurated over the 1400-mile, round-trip route between Boston and Akron on a regular schedule with pneumatic equipment, the object being to secure data for defining the distinctive fields of solid and pneumatic trucking in view of all conditions.

It thus occurred that the inhabitants along the Lincoln Highway through Pennsylvania looked up in surprise one day to see a large five-ton truck rolling along at touring-car speed, on eight and ten-inch pneumatic tires, actually beating the one-way express schedule, yet with such smoothness of motion that a spare operator could sleep as comfortably aboard as in an ordinary Pullman berth, if not more so. After several trips back and forth, three more long-distance trucks joined the pioneer to form an express fleet, running on regular schedule from Ohio to New England points, and people began to wonder whether this might portend a new era in modern freight transportation.

The experiment was fairly providential in relation to the war, when railroads were badly overburdened and when the motor truck had been called upon to save the nation from the peril of totally inadequate transportation facilities and to perform many feats to which they were wholly unaccustomed. Equipped with solid tires they had been pressed into service for hauling loads over long distances between cities, and even from the Middle West to the Atlantic seaboard.

Two important facts had been revealed to the Government through these experiences. First, that motor trucks on solid tires were largely limited in usefulness to hard surfaced roads, since these tires would slip and spin, or stall, in mud and ice and snow. Second, it was clear that the pounding of the solid-tired truck was damaging to every kind of road.

A prime end of the Akron-Boston experiment was to demonstrate to the United States Government that the giant pneumatic tire offered the opportunity for motor trucks to become vastly more useful than they ever could be on solid tires. It was shown over a period of two years on every type of road and through the snowy passes of the Alleghenies that pneumatic tires not only enabled trucks to negotiate snow and mud where solid-tired government trucks had stalled, but also that the pneumatic equipment meant a marked saving to the roads themselves. How well, has been attested by the rapidity with which the pneumatic tire was adopted by the government truck service and also by the public following upon that epoch-making trial. Thousands of private truckers hastened to adopt the new equipment, the economy and efficiency of which is confirmed by the continuous operation of the Akron-Boston service to the present day, two big trucks still handling rush shipments from Boston to Akron long after the railroad war-time shipping crisis has passed.

ADVANTAGES OF PNEUMATIC TRUCK TIRE EQUIPMENT.

Pneumatic tires on motor trucks save the load, the truck and the road, permit better time and therefore increase the amount of load that can be hauled in a given time. They have thus been a great aid in promoting universal use of the motor truck.

The country has been discussing the subject of the effect of heavy trucks on interurban pavements. Pneumatic tires on trucks work no harm to the roads, for they are built to distribute the load properly on the road surface. It is not primarily the weight of a truck that harms the road, but the bumping and pounding of the truck. With pneumatics this is eliminated, for the tire tread accommodates itself to the road surface and has no more harmful effect than a passenger automobile tire has.

DEVELOPMENT OF THE PNEUMATIC TRUCK TIRE.

While the establishment of the pioneer Akron to Boston express perhaps marks the turning point in the general adoption of pneumatic equipment on motor trucks, it was by no means new in 1917. In fact, the year 1908, nearly ten years earlier, marks the first efforts to develop a pneumatic tire suitable for truck service. The first tire produced was a 38 by 6 size of fabric construction. In 1908, 1909 and 1910, quite a few of these tires were applied to fire apparatus where the need for pneumatic cushion seemed most necessary. These early tires were quite satisfactory on fire trucks where the runs were short and the service was not continuous.

Starting with the six-inch tire in 1908, tires of seven, eight, nine, ten and twelve-inch sections were developed within the next few years. All of these tires were of fabric construction. As in the case of the early six-inch fire-truck tires these other sizes did fairly well in the fabric construction for short hauls and intermittent service. But when they were used for long hauls and under severe conditions, it was found that the intense heat generated caused the tires of fabric construction to disintegrate too quickly.

LARGE CORD CONSTRUCTION.

Now came an improvement of scarcely less significance than the adoption itself of the pneumatic tire. The principle of cord construction developed steadily through the years and was made practical for the more powerful gasoline passenger cars. The progress made in this direction pointed to the possible solution of the problem of pneumatic tires for trucks.

Finally the development of the cord tire was merged with the pneumatic truck tire in 1916 and the cord pneumatic truck tire was produced. This tire stripped away the limitations of the fabric type and made possible the use of pneumatics in the most severe service possible, as proved in the 1500-mile round trip between Akron and Boston.

Since the introduction of the pneumatic cord truck tire in 1916, and its thorough demonstration in 1917, the use of pneumatics has expanded rapidly. All tire manufacturers have adopted as standard the final sizes developed in 1914, including the 36 by 6, 38 by 7, 40 by 8, 42 by 9, and 44 by 10.

Thus, through some eleven years of development work, there has been provided for the truck industry and the public an improvement which bids fair to revolutionize motor truck transportation throughout the world. The cord tire has demonstrated that its great cushion and traction will enable the motor truck to do things heretofore impossible on solid tires. It is opening up new fields of usefulness for the motor truck and well informed men now look for a more rapid development in the truck industry than we have had in passenger cars, now that trucks can enjoy the same tire advantages that passenger automobiles have had.

PEACE PROBLEMS AND PROGRESS.

THRIFT CLUBS IN RUBBER FACTORIES.

America has made tremendous strides in thrift during the four years in a continuance and increase in the practice of consistent savings is what the country needs above all else to bridge the present crisis, pay the nation's debts, and bring high prices down. Reckless spending by the individual is the greatest danger confronting the United States to-day. Hard work, common sense economy, wise buying and systematic saving on the part of everybody are required to avert national disaster and convert our war liabilities into peace assets.

To this end the Treasury Department is engaged in a great campaign to spread the gospel of saving and safe investment through the increased sale of Thrift and War Savings Stamps and Treasury Savings Certificates. It is asking employers of labor everywhere to encourage the organization of War Savings Societies and will also cooperate with manufacturers' representatives in forming organizations for accident prevention to be known as Accident Thrift Clubs, the two purposes often being served by a single organization. Organizers are being sent into factories to help select officers, provide program material, furnish the initial stimulus and arrange systematic savings schemes for employes according to their incomes. This salutary movement is making headway in many rubber factories, and firms wishing to institute it among their own operatives should communicate with the Savings Division, War Loan Organization, United States Treasury Department, Washington, District of Columbia.

A NATIONAL THRIFT WEEK.

The Savings Division of the United States Treasury Department has announced plans for a National Thrift Week beginning January 17, 1920. The purpose of the week will be the endeavor to start the country off in the New Year with a sound financial program for every individual and household. Two ends are sought; first, that the condition of the individual be improved, and second, that the financial and industrial strength of the nation be increased by the great sums of capital which will accrue through the practice of steady saving and safe investment on the part of citizens. The program for National Thrift Week, as at present tentatively planned, is as follows:

National Thrift Day, Saturday, January 17, 1920.—To enlist the Nation in a campaign to "Save first and spend afterwards," making the present insure the future by regular saving to finance future opportunities or needs, and investments, preferably in loss-proof government securities.

Thrift Sunday, Sunday, January 18.—Sermons in all American pulpits on the relation of economic life to religious well-being, and the need of sharing with others.

National Life Insurance Day, Monday, January 19.—To emphasize the importance of protecting one's family with life insurance.

Own-Your-Own-Home Day, Tuesday, January 20.—To show why desirable and how possible to own a home.

Make-a-Will Day, Wednesday, January 21.—To urge men to make wills, and in so doing impress upon them the necessity of making provision for the future.

Thrift-in-Industry Day, Thursday, January 22.—To emphasize the need for factory thrift, and the economic value of cooperation between capital and labor.

Family Budget Day, Friday, January 23.—To show the importance of using the budget plan in family finance.

Pay-Your-Bills Day, Saturday, January 24.—To emphasize the moral obligation to pay debts.

Manufacturers of rubber goods and employers of labor in all allied lines can benefit themselves as well as the whole country and their operatives by cooperation in inculcating these principles in thrift, and by the sale of Savings Stamps and Treasury Savings Certificates through their offices. Investigation would probably show a large number of persons who would gladly take a definite percentage of their weekly salaries or wages in these interest-bearing Government securities.

CENSUS FOR MANUFACTURERS.

The schedules to be used in tabulating information for the approaching Fourteenth Decennial Census of the industrial resources of the United States will be mailed to every manufacturing establishment in the country during the month of December so that factory owners and managers can familiarize themselves in advance with the questions to be answered when the records of business for the calendar year 1919 have been compiled.

In addition to the general schedule a supplemental schedule will be sent to the 68 principal industries as classified by the Census Bureau. This supplemental schedule will allow detailed statistics of output to be set forth under the heading "products manufactured." All information gathered is strictly confidential and is to be used for general statistical purposes only.

Rubber Factory Foremanship.

By James Wright Cary.

A FOREMAN is one whose acquaintance with a business, competence in directing workmen and handling detail, warrants a superintendent in placing him in charge of a department. Where the "line control" method was followed he had a wide range of responsibilities, such as hiring and discharging workmen, O-K-ing time tickets, placing orders in process, obtaining supplies for his department, controlling wage rates paid to the men under him, and repairing machinery. In the circumstances it was perhaps natural that he should believe he knew his job better than anyone else, and he probably did. He was jealous of his authority, prerogatives and so-called "rights"; was intolerant of outside suggestion, a foe to changes and improvements unless recommended by himself; paternal and dictatorial toward his men; knew, or thought he knew how each phase of the work should be done; intended to be, and was consulted constantly as a matter of necessity, there being no one else; and at the same time was strangely unconscious of a well-developed "blind spot," one indication of which was his persistent refusal to train an "understudy."

Later, when meetings between the superintendent and the foremen became a regular feature of the organization, he sat in with considerable reluctance, and discussed the subjects under consideration, or offered suggestions for improvements in his own department just in proportion as he possessed an open mind, or was conscious of the necessity for, or ambitious to see improvements.

This type of foreman has held his own well down to the present, and belongs to what may be called the "old school." To him, the new ideas that began, little by little, to filter through the cracks in old line organization were things genuinely disturbing. He thought the old way was a good way, and in many respects it was. He knew that the management had depended upon him in a hundred ways, and had trusted his judgment and fidelity, his acumen, foresight and force. He had worked up from the bench, probably in surroundings inconvenient and unsanitary as compared with present-day equipment; had seen his department expand from a few men to a hundred or more, and new machinery take the place of old. He knew the whole story, and his fiber was interwoven in every line, and his personality impressed on the product from his department. He was genuinely attached to the shop, and in particular to his department, and was regarded as a successful foreman.

When the shop was small he was pretty generally informed as to the whole lay-out, but as the business grew he was more and more confined by his duties, and his time and energies were absorbed by them. The natural consequence was that the detail of other departments escaped him, and very gradually but surely he became detached from them. He was a capable mill-room or other foreman, but he knew little about spewing machines, tire building machines, presswork, shoe-making, or vulcanizing. He could handle men, but knew little of costs, up-keep or scientific management. He was simply a spoke in the big wheel, but as such was very competent, and in taking off my hat to him I wave him farewell, for this particular type of factory executive is passing. The forward-looking factory management will demand and secure foremen of a different type, better equipped. Like the old, they will be dependable, forceful, systematic. Like a trained chemist they must be able to analyze many things. The new system will require them to be specialists in more than one direction.

An expert shoemaker under present practice may be selected for inspector, and then it is but a step to the position of foreman. Or a cost clerk, as a reward for success, may be placed over the tire makers.

What to do with the old foreman? It will depend on what the laboratory terms his "elastic limit." In other words, can he absorb new ideas and develop accordingly? Can he match the new pace and keep up with it? The new method proposes to give him every opportunity and encouragement to do so. The chief difficulty will be found probably in his attitude of mind. If he is ossified in the belief that his is the one best way; if at heart he is opposed to changes; if he balks and uses his influence to create and maintain hostility among employes, then he will have to make room for the man who can meet the new proposals with an open mind and the paramount desire to be of the greatest possible benefit in the organization.

The new method begins with the scientific selection of men. Not that the old way was a failure, but the new way will require more from a foreman at the start and secure corresponding results from him afterward. He must have all the good points demanded under the old régime, plus a lot more.

Is there such a thing as scientific selection of the man? Undoubtedly. You do not pick a plow horse for a racer, nor does the crow displace the carrier pigeon for carrying messages from the battlefield. Consequently there must be a type of man who possesses inherent qualities capable of development along lines that will make him a factory executive, beginning with foremanship. In the search for this exceptional man, however, the very first thing to be assured of is the physical basis. This is a feature of profound significance. Suppose you find a man who qualifies intellectually, and you school him and coach him and spend a lot of good money to equip him for the exacting duties of the position ahead, and just at the time he is ready to qualify he goes to smash with a bad lung; or, in the midst of a strenuous campaign where he is called upon for every ounce of his personal equipment, he becomes a nervous wreck.

Is, therefore, the possession of a fortunate combination of brain and brawn essential to successful foremanship? Absolutely. Having picked your man physically, the point next in order for investigation is intellect. Intimately associated therewith is a man's schooling. He may have been a star quarterback, or able to bat a ball to the bleachers, but if he "fell down" in his studies while in school, you do not want him. There will, of course, be exceptions, but as a rule the man who showed no aptitude nor ambition in securing the rudiments of an education, will, as a sequence, not have received that mental development essential to enable him to "carry on" in the particular field under discussion. The better the mental equipment, the better are the chances for successful foremanship.

Having picked a man with brain and brawn, the third essential is temperament. Given a man with physique and mental equipment, it does not follow that, tossed in a blanket, he will land on his feet. He may be temperamentally unfitted for foremanship. He may lack that vital essential, control of men. He may have no "head" for detail, and a lot of other things.

It is but fair at this point to give the psychologist an opportunity to "show him up." Some doubt his value. Many a superintendent prefers to trust to what he calls his "judgment" of men; he can "size them up." This faculty has been termed the "sixth sense," but is after all, really psychology. But psychological or not, it is certainly good sense to take into account a man's bearing, his facial angle, his voice, eyes, walk, and especially any eccentricity that may distinguish him from the ordinary run of men. These in sum make up for you a replica of the man himself, and enable you to determine whether he is worth taking a chance on. For, taking it by and large, it is more or less of a gamble whether results will justify your choice.

It facilitates matters to chart your man. Make up a list of the qualities you wish a foreman to possess. Professional psychologists follow this method. Dr. Blackford thinks an executive should possess a "keen sense of justice, courtesy, dependableness (constancy, reliability, uniform disposition), courage, love, teachableness (ability to learn even from the lowest worker), openness of mind, tactfulness, sympathy (ability to appreciate the other man's position), understanding of human nature." William Kent would have him possess, "education and special knowledge, industry, aggressiveness, health, energy, initiative, tact, personality." Frederick W. Taylor would have chosen men with "brains, honesty, education, judgment or common sense, tact, technical or special knowledge, manual dexterity or strength, energy, grit, good health."

It is singular that these "authorities" should not more closely agree as to the elements that predominate in the 100 per cent man. Here are afforded, however, suggestions sufficient to aid in the creation of a chart for guidance, whereon to note impressions of the men selected for foremen, or for any other position. Naturally you will have these charts frequently before you, "keeping tabs," correcting first impressions, probably, and finally obtaining an accurate record of each man in whom you have a special interest.

You have, let us assume, a dozen men selected from among the foremen of as many different departments, and also a dozen "green" men picked from the ranks of whom you conceive as possessing abilities worth your time and money to develop. All these men have been under observation for some time, and to them you have confided your aim. The chances are the foremen know little about the factory outside their departments, and the new men are getting their first real acquaintance with rubber goods manufacture.

With the selection of these men enters your responsibility to train them so well that within a reasonable time they will be equipped to demonstrate in a practical way the value of the method you have employed. There are, doubtless, divergencies of opinion as to the details of such training, but the fundamentals are easily discernible. First, a basic knowledge of rubber; sources; methods used in its gathering or production in forest or plantation; its chemistry, inspection and selection. Second, manipulation and preparation for use in manufacture. This will carry the student through washing, drying, compounding, mixing, calendering, and include the preparation and use of fabrics. This knowledge must be acquired by personal contact with the work. The student should manipulate the compounds and understand why they are employed. He should work as one of a "crew" at every preparatory process, and should be coached and catechized frequently that there may be no question that he is acquiring a practical working knowledge. This he can demonstrate very readily by giving in writing the detail of each step in each process he observes. Furthermore, he should be encouraged in a critical attitude toward machinery, methods, appliances, and personnel, and to suggest betterments. This method will surely show whether a student has the critical faculty, constructive imagination, and practical ideas, all of which are essential to the equipment of the man who would qualify for foremanship. Having mastered basic details, the student should next acquire a working acquaintance with individual processes. He should learn to run a spewing machine, a jar-ring cutter, a sole cutter, a vulcanizer. He should learn how to make automobile casings, and tubes, hose, belting, shoes, and packing. In short, he should acquire a practical knowledge of how all of the goods produced by the factory in which he is employed are made.

As to the time required to complete such a course of study, it naturally depends on the man. Much could be accomplished in three months by intelligently directed, concentrated work. It is just as well to remember first, that men are being trained for executive factory positions in your factory, men to whom great responsibility will be entrusted, not for one year, but for many years, and that you can well afford all the time necessary to gain this end; second, that there is bound to be a noticeable difference between these men in their quality, capacity, and ultimate value, and that a successful course of training must be based upon this. He would be a foolish tailor who tried to fit all men with one size of suit; he, per force, has several sizes, or he does little business. Why not have a series of study courses to which individuals will automatically adapt themselves? For example, the first lesson series would cover the study and manipulation of crude rubber, compounding ingredients and fabrics, the machinery required, and the manufacturing processes involved, supplemented by reading such works as "Crude Rubber and Compounding Ingredients," "Rubber Machinery," etc. Also lectures should be delivered before students by the master mechanic and the chief chemist. This series should be quickly disposed of, depending much on the skill with which you have picked your men. By this time you will have gained a better acquaintance with them and may have reason to believe there are some whose capacity for knowledge has reached the "saturation point."

Have prepared a second series for those who are fortunate enough to "carry on." This will include the study and practice of job analysis as applied to machinery, methods, men, and factory conditions; time study of manufacturing operations with a view to suggesting piece-work rates, which may be checked against those in force, simply for the education of the students. Incidental readings would cover such authors as Taylor, Gannt, Gilbreth, Emerson, Thompson, Knoeppel, Diemer, and others; also the current magazines devoted to manufacturing and kindred subjects. Lectures should be provided related to the general scheme, such as factory construction and equipment, chemistry of india rubber, production and use of power, machinery and tools, management of a work force, wages, etc.

A few words regarding job analysis and time study seem pertinent here. It must not be supposed that anything of a superficial nature will suffice to fit a student to make a proper job analysis, any more than holding a stop-watch on a factory operation constitutes time study. Much of the disastrous record in the past is directly chargeable to lack of proper preparation in these two lines. Job analysis requires a combination of trained observation coupled with good, practical ideas. Efficiency in making a time study cannot be acquired in a day or a week, even if intelligently directed, and it is open to question whether there is in the average factory organization any written standard practice worthy the name, giving detailed instruction of how a student should be trained for this work. It is no part of this discussion to devise a curriculum covering these subjects, but to point out that the average man has few qualifications for dealing with them. If, therefore, you are fortunate enough to bring forward all members of the school into the second series, by this time you may find some who have reached their intellectual limit, or at least do not show that capacity for assimilating knowledge that will warrant introducing them into a third series. Those who were found to have serious limitations need not necessarily be classed as failures, for each takes automatically, as one might say, his position in the scholastic gage-glass, according to his specific gravity.

There remain for further schooling the top-notchers from whom may be properly expected the highest returns. These men should give special attention to factory organization and management, interdepartmental relations, planning, routing, costs, waste, power, standardization, welfare, betterments, and so on, to the end that they may become foremen in name, but in reality, assistants to the superintendent. In sum, you will have secured men who know the manufacturing of rubber goods thoroughly, and are specialists in the lines made in your factory. They have worked with the factory rank and file to the point where they will be a credit to your organization.

LONG-STAPLE AMERICAN-EGYPTIAN COTTON.

LONG-STAPLE COTTON of the American-Egyptian type needs, as conditions for successful production, an unusually long growing season, freedom from boll weevil and an assured supply of water for irrigation, Dwight B. Heard told the Cotton Conference that met in New Orleans in October.

The production in 1918 was 38,246 bales of 500 pounds each of long-staple cotton, 34,300 of which were grown in the Salt

A FIELD OF AMERICAN-EGYPTIAN COTTON.

River valley of Arizona, 1,200 each in the Gila valley and in the California Imperial valley and smaller quantities in the Colorado valley in Arizona and the San Joaquin and Palo Verde valleys in California. Besides this, the Imperial valley produced 35,000 bales of short-staple and 5,000 bales of Durango cotton and the Yuma valley 20,000 bales. The short-staple product this year will probably be 10,000 bales larger, while the long-staple Pima crop will be over 50,000 bales.

This crop was of exceptional interest to spinners and to the manufacturers of choice cotton goods because the new Pima cotton was quite as desirable as Egyptian Sakellarides and could be spun into equally fine counts. In 1918, on an ordinary run of 2,112 bales at the gin of the Tempe Exchange, at Tempe, Arizona, under government classification and supervision, the grade and percentage of this lot of Pima cotton ran as follows:

Grades.	Per Cent.	Staples.	Per Cent.
No. 1 or fancy	14	1 1/2 to 1 3/4	61
No. 2 or extra	52		
No. 3 or choice	17	1 7/8 to 1-M	37
No. 4 or Standard	9	1 1/2 to 1 7/8	2
No. 5 or medium	7		

In 1919 the percentage of cotton running 1-11/16 and 1¾ was larger than in 1918. The remarkable success in the Salt River valley, where 95 per cent of the Pima cotton produced in America will be grown this season, is largely due to the scientific care with which this industry has been developed. One feature is the fact that but one type of American-Egyptian cotton, Pima, is grown throughout the entire district and all danger of crossing with inferior seed is avoided. Of the total area of 275,000 acres now under intensive cultivation by irrigation in this district, 88,000 acres, or 32 per cent. of the entire acreage, is planted in Pima; a percentage which can be readily maintained.

The growers realize that the immunity of the Salt River valley from the boll weevil and other pests which have handicapped the cotton industry in other sections must be maintained, and with the cooperation of the Government the best methods not only to prevent the importation of seed in which there could be any danger of infection, but to maintain the highest standard in the selection of the local seed, have been practiced. The cotton plant is essentially a sunshine plant, and there is probably no section of the world except Egypt where the sun shines with more regularity than in the Salt River valley.

This year 88,000 acres in the Salt River valley alone are planted. The land has been more carefully selected than before and it is not unreasonable to assume that from 45,000 to 50,000 bales of Pima cotton will be produced. In the Florence and Casa Grande valleys, including the Sacaton Indian Agency, southwest of Phoenix, this year's production will probably equal 2,500 bales, while in the Yuma and Parker valleys, along the Colorado River, and in certain sections of the San Joaquin valley in California 1,500 to 2,000 additional bales of Pima cotton can be expected, making a total production for this season of from 50,000 to 55,000 bales. In the Salt River valley there should be for sale this year from 20,000 to 25,000 bales of unmortgaged cotton.

It is significant that last season the total production of Pima cotton equaled the production of Sea Island cotton. The total manufacture in the United States of long-staple cotton, either Old-World Egyptian or Sea Island cotton in the five years previous to our entry into the war, was 275,340 bales annually, of which 78,650 400-pound bales was Sea Island.

With the increase this year of the production of Pima American-Egyptian cotton to approximately 50,000 bales, while there are only 15,000 bales of Sea Island cotton, it is manifest that the Pima cotton has become a very material factor in the long-staple market.

MEADE COTTON A SUBSTITUTE FOR SEA ISLAND.

Disheartened, and hopeless of the recovery of Sea Island cotton from the continued invasion of the boll weevil, the United States Department of Agriculture recommends the substitution of Meade cotton, developed by the Bureau of Plant Industry.

Meade cotton is a new upland long-staple variety, which is the nearest approach so far to Sea Island cotton in length and fineness of fiber and is recommended particularly to planters in the West Indian islands. It is named after the investigator of the Bureau of Plant Industry who was improving the variety when he died. It now produces lint averaging 1⅛ inches in length with unusually uniform fibers. The seeds are large and yield a high percentage of oil, about 24 per cent. They are slightly tufted at the ends like the seeds of Sea Island and Egyptian cotton, so that it is possible to use for this cotton the roller gins employed for Sea Island cotton.

In 1917 Meade cotton was picked two weeks ahead of Sea Island. It yielded twice as much, 230 pounds compared with 117 pounds, and it was easier to pick because the bolls are twice as large as Sea Island bolls. The lint ranges between 1⅛ and 1=11/16 inches, has good luster, a slightly heavier body than Sea Island and is scarcely distinguishable from it when properly ginned. It should be treated in the same manner and as carefully as Sea Island.

VENEZUELA'S CHIEF IMPORTS, AMONG WHICH WERE RUBBER articles and duck, were transported mainly by parcel post during the years 1917 and 1918.

Interesting Letters from Our Readers.

ANALYSIS OF THE COVERINGS OF A ZEPPELIN.

TO THE EDITOR:

DEAR SIR:—The external covering (of a Zeppelin) was made of a tissue that was colored grayish blue at the top and black at the bottom. The gray blue was obtained by printing with indanthrene blue by means of a roller engraved with very fine lines as though for a border of calico. The tissue covered with its varnishes weighed 146 grams a square meter.

Treated with hot tetrachlorethone it loses its varnish of cellulose acetate which dissolves; with the varnish gone the tissue preserves its coloring, therefore it was printed before varnishing. The composition of the tissue per square meter was:

	Grams.
Printed cloth	113.8
Cellulose acetate	32.6

The prime material of the tissue was cotton in very fine threads. The lower portion was wholly black. It weighed 127.60 grams per square meter. Treated with solvents it yielded (1) Cellulose acetate, (2) Japanese black varnish.

After the black varnish was removed it showed a blue-gray coloring like that of the tissue of the upper portion. The black varnishing seems to have been put on after the balloon had been constructed, in order to make it less visible. The composition of the tissue, per square meter was:

	Grams.
Printed tissue	86.80
Cellulose acetate	31.9
Black varnish	7.

The tissues contained no trace of rubber varnish. The covering of the interior small balloons intended to hold the hydrogen was made of a thin silk tissue, covered with a varnish formed of: (1) Factices of chloride of sulphur that could be extracted with alcoholic potash. (2) A fat varnish of linseed oil. (3) A varnish with a base of coumarone or of bakelite soluble in alcohol.

On this tissue were glued by means of a varnish of cellulose acetate two layers of gold-beater's skin. These gold-beater's skins were covered with a supple layer of cellulose acetate with a base of furfurol. The composition of the tissue was as follows:

	Grams.
Weight of whole tissue per sq. meter	180.
Weight of varnished tissue	103.
Weight of varnished gold-beater's skin	77.
Weight of silk tissue	84.1
Various varnishes of tissue	18.9
Pure gold-beater's skin	65.1
Varnish of gold-beater's skin	11.9
Total weight of varnishes	30.

This wrapper bore no trace of rubber.

ANDRÉ DUBOSC.

Paris, France, November 20, 1917.

PHILIPPINE GUTTA AND THE BRITISH.

TO THE EDITOR:

DEAR SIR:—I understand from the newspapers that the gutta percha in the Philippine Islands is owned by the British. That we Americans are practically frozen out and cannot cover our own cables without English consent. Is not this another case of unwarranted British aggression?

JOHN MCCORMICK.

San Francisco, California.

(The newspapers are wrong. Philippine gutta belongs to the Filipinos, is gathered and marketed by them The middlemen are Chinese who ship it to Singapore, grade and sell it. If you desire to lay a cable you can buy gutta in the Philippines if the Chinese do not get it first. If you do not plan cable construction but are simply working up a racial grudge better thrash a Chinaman. Don't hit an Englishman; first, because he is not at fault and second, because he is liable to hit back.—The Editor.)

A BIT OF CHARLES GOODYEAR HISTORY.

TO THE EDITOR:

DEAR SIR:—I wonder if you know that a man lives at the Congress Hotel in Chicago who was at one time quite intimately connected with Charles Goodyear? He is Mr. I. S. Deutsch, whose father bought the Goodyear estate at Burrville, Connecticut.

As a boy, Mr. Deutsch ran across a great variety of experimental curios left by Charles Goodyear. Later, Mr. Deutsch married one of the daughters of the late J. M. Brunswick, the pioneer of the Brunswick-Balke-Collender Co., and here again he was brought into contact with india rubber. For example, Mr. Bensinger, another son-in-law of Mr. Brunswick, was closely associated with Dr. B. F. Goodrich, and it is said that it was he who exerted strong influence in inducing Dr. Goodrich to go to Akron. As Mr. Deutsch remembers it, Dr. Goodrich's intention at first was to confine his factory output to hard rubber. He, however, later went into mechanical rubber goods and a general line, some of which were made on patents owned by Dr. Goodrich and Mr. Bensinger.

Strange to relate, Mr. Bensinger was one of the first to suggest the amalgamation of canvas with rubber to get additional resiliency and durability, essentially the same construction as is now used for the manufacture of tires.

W. C. JENKINS.

Chicago, Illinois.

(Bits of history of this sort are exceedingly interesting as they give valuable sidelights on matters that are oftentimes either forgotten or misunderstood. It is the writer's impression, however, that the hard rubber business which Dr. Goodrich took up came about long after druggists' sundries and mechanical goods had been installed and successfully manufactured. It may be true that Mr. Bensinger first suggested the amalgamation of canvas with rubber in Akron, but such use had been made in other manufactories for thirty or forty years, and indeed, dates back to 1820, to be exact, when it was used in England. In fact, it antedates the discovery of vulcanization. This statement of course is not made to minimize in any way the work that either Mr. Bensinger or Dr. Goodrich did, as the great company that was built up through the pioneer efforts of these men speaks for itself.—The Editor.)

RUBBER IN SLICKERS.

TO THE EDITOR:

DEAR SIR:—In the so-called slicker as made to-day, is rubber used? Also, was it used in the old-time slicker of forty years ago?

JOHN E. REYNOLDS.

Rockport, Massachusetts.

(The slicker as made to-day contains no rubber. It depends upon specially prepared oil for its waterproof qualities.

Years ago, however, rubber was used in making the old fashioned Cape Ann slickers. One of the prominent manufacturers forty years ago was Levi Nicholson of Swampscott. They were also made far down on Cape Cod and by Cummings & Howes at Orleans. They went out of business 35 years ago. The recipe used was:

1 gallon linseed oil.
1 gill Pratt's zinc dryer.
1½ ounces red Pará rubber.
Lampblack dissolved in turpentine to color.

One successful manufacturer treated the oiled surface with a sour milk wash with good results, an acid cure through the use of lactic acid.—The Editor.)

What the Rubber Chemists Are Doing.

By P. Schidrowitz and H. A. Goldsborough.

STUDIES IN VULCANIZATION.
THE RUBBER STRESS-STRAIN CURVE.

THE AUTHORS have published the first of a series of papers* in which they purpose to carry out their deferred plan to discuss their studies in vulcanization. The leading features of their paper on the rubber stress-strain curve and determination of "correct cure" are given below, necessarily somewhat condensed.

NATURE OF STRESS-STRAIN CURVE.

E. Hatschek and H. A. Goldsborough examined the practicability of obtaining a single expression for the stress-strain curves of a series of cures of the same mixing. (The mixing employed in the fundamental experiments consisted of 100 parts of rubber to eight of sulphur, cured for periods varying from 15 to 405 minutes at 286 degrees F. in molds in live steam).

As bearing on the mathematical nature of "type," it is desirable to restate, briefly, the following characteristics of progressive cures of the same rubber-sulphur mixing, as first set forth by Schidrowitz:

1. The process of vulcanization is physically and mechanically of a definitely progressive character, and its progress can be accurately and graphically represented by a series of stress-strain curves.

2. The state of cure of a given mixing of any rubber at any given time (assuming standard conditions) is graphically expressed by the form and position of the corresponding stress-strain curves representing progressive cures which bear a certain mathematical relationship to each other for any one rubber, and a relationship exists between the series of curves representing progressive cures of any one rubber and the series of cures representing progressive cures of any other rubber.

3. As curing proceeds the curves come farther down the paper in regular fashion and do not intersect at any point.

4. At a part of the curve not far from the point of inflection the curves become parallel to each other. That is to say, the rate of stretch decreases with increasing loads, and is independent of the state of cure. The above characteristics for a single set of cures may be readily gathered from Figure 1.

Examination of the curves showed that they belong to the conchoid family, and it was found that a conchoid corresponding closely to the rubber curve could be expressed, referred to Cartesian coordinates as follows:

$$y = a - b \sin \alpha.$$
$$x = n\ (a \cdot \cot a - b \cos . \alpha)$$

The rubber curve is derived from the parent conchoid by plotting the ordinates against a constant fraction (n) of the corresponding abscissa, as expressed in the above equations.

The interpretation of the terms in the above expressions may be obtained from the following considerations:

(1.) a represents the distance between the pole of the curve and the asymptote.

(2.) n is a constant in the expression $x-(nx')$ in which x is the load at any point on the stress-strain curve and x' is a corresponding point on the parent conchoid.

(3.) $a.n$ is a constant for any given set of curves.

(4.) n represents the increase of stretch per increment of load, or in other words slope or "type."

(5.) Hence a/n or $1/n$ is the degree of stretch or distensibility.

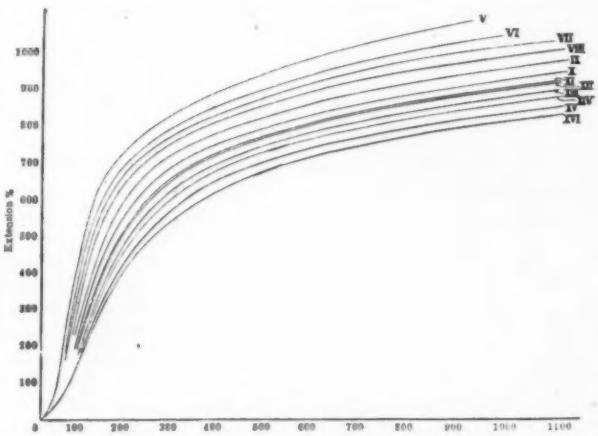
(6.) It follows that a represents a quality which is the inverse of stretch capacity, namely, toughness or tenacity.

(7.) b represents the limits of extension.

In every set of curves (progressive cures of the same mixing) there must be a specific curve in which $a = b$. It follows that this specific curve represents a theoretically ideal balance of properties. The curve in question is the one we term the correct or perfect cure.

It is remarkable that $a.n$ (*i. e.*, slope or type), which obviously represents a fundamentally important quality of a rubber, is a constant for any rubber, theoretically from the point of inflection upwards and actually, as found experimentally, from a point not far removed from the latter.

Expressed in other terms, this means that after the initial stage of stretching, equal increments of load produce equal elongations, whatever the state of cure.



LOAD (GRAMS PER SQUARE MM. CROSS SECTION).

FIG. 1. STRESS-STRAIN CURVES REPRESENTING SUCCESSIVE CURES OF ONE MIXING AT 15-MINUTE INTERVALS (*e. g.*, V = 75 MINUTES, VI = 90 MINUTES, ETC.) IN STEAM AT 286 DEGREES F.
PART OF A SERIES FROM 15 MINUTES TO 6¾ HOURS.

It has been found by solving the correct cure curves by the method of trial and error that all correct cure curves are derived from the parent conchoid in which b (and therefore also a) = 10.5. Since the curve meets the asymptote at infinity, it follows that we are justified in concluding that all correct cures of a standard mixing consisting of 100 parts of rubber to eight parts of sulphur (whatever the nature of the rubber, provided it is *Hevea*) meet at a point for which the coordinates are $y = 10.5$, $x = oc$; that is, an extension of 11.5 times the original length is the limit of distensibility.

METHOD OF DETERMINING "CORRECT CURE."

From the above it will readily be inferred that to obtain the correct cure it is necessary to determine a, b and n. In other words, it is essential to determine (1) type and (2) the particular curve in any set in which $a = b$.

TYPE.

In practice the determination of $a.n$ ("type") by means of the expressions corresponding to the coordinates is obviously inconvenient. Taking advantage of the fact that "type" represents increase of stretch per increment of load, we determine the

*"Journal of the Society of Chemical Industry," September 15, 1919, page 347T.

property by measuring the increase in elongation corresponding to two suitable points on the load coordinate as follows:

$$\text{Type (Conventional} = \frac{E_1 - E}{2.5}$$

Where E = extension per cent at 600 grams per square millimeter and E_1 is that at 1040 grams.

The extensions corresponding to the loads stated for various types for the correct cure in each case were found to be as follows:

TABLE I.

Types 33 to 45.

"Correct" cure extensions at 600 grams and 1,040 grams per square millimeter (mixing 160 of rubber to 8 of sulphur).

Type.	Extension, Per Cent. 600 Grams per Sq. mm. (E)	1040 Grams per Sq. mm. (E_1)	$E_1 - E$
33	826†	908‡	82
34	815	900	85
35	805	892	87
36	794	884	90
37	783	875	92
38	772	867	95
39	761	859	98
40	750	850	100
41	740	842	102
42	729	834	105
43	718	825	107
44	707	817	110
45	697	809	112

† 9.26 Times original length.
‡ 10.68 Times original length.

A glance at the above table and Figure 2 will reveal the fact which is of fundamental importance, namely, that the lower (or better) the type figure (*i. e.*, the more rapid the decrease in extension with increasing tension towards the end of the curve), the less rapid is the decrease in the initial portion. In other words, a curve representing a rubber A which is flatter in type than rubber B, will lie for the whole of its course above the latter at the correct cure (*i. e.*, where a = *b*). As confirmation in this connection it is interesting to note that de Vries and Hollendorn§, in a paper from the Central Station at Buitenzorg (which has adopted our method of determining "type"), found that "the maximum of tensile strength is found higher on the paper the flatter (smaller) the 'slope,' that is, the better type or quality as determined by this property." These authors found a range of variation in different grades of plantation rubbers of 36 to 53.

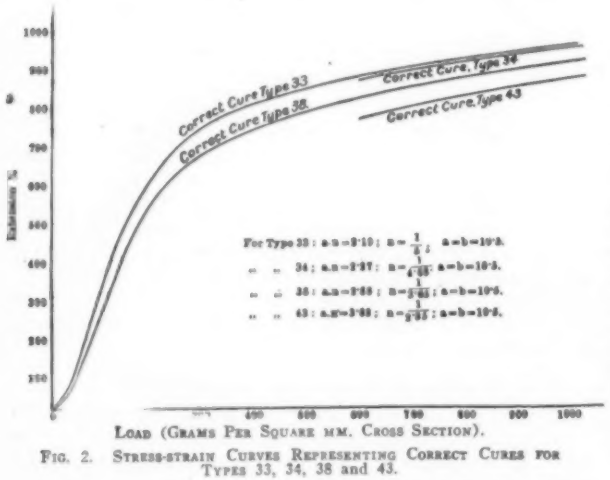

Correct Cure Type 33
Correct Cure Type 38
Correct Cure, Type 34
Correct Cure, Type 43
Extension %
Load (Grams Per Square mm. Cross Section).

FIG. 2. STRESS-STRAIN CURVES REPRESENTING CORRECT CURES FOR TYPES 33, 34, 38 and 43.

The same authors in a previous paper‖ found that "the permanent set for one standard state of cure shows a close relationship with the property called 'type.' by Schidrowitz. . . . As the 'type' in ordinary routine testing of raw rubber can be determined in the same operation as tensile strength, a separate test for permanent set, when using the above-named mixture of rubber and sulphur only, is superfluous for ordinary samples. Only in the case of rubber prepared by special methods a deviation from the above given relationship may occur and lead to important conclusions."

A consideration of the above will demonstrate the fallacy of measuring the quality of a rubber by the resistance to stretch method, which consists in determining the load necessary to produce a given extension at a single point, and assumes that the greater the load the better the rubber. For rubbers of different "types," the reverse is actually the case. Further, it is obvious that the application of this method for determining state of cure, as suggested ¶, may give fallacious results.

NON-VARIATION OF TYPE.

The authors have demonstrated that the constancy of *a.n* or "type" is not subject to variation by experimental conditions, citing particularly variations in curing time; mixing by different operators and machines; curing in different vulcanizers; method of heating; overworking the rubber mixing and variations of "rest" or "storage" after mixing.

THE CORRECT CURE.

We have shown that the curve in any series of cures which we select as the "correct" cure possesses certain attributes which represent (theoretically) an ideal balance of properties. It is the curve in which *a*-*b*, that is to say, the toughness or tenacity equals the limit of extension. It is obvious that for purposes of comparative evaluation of crude rubber, a certain definite curing standard must be selected.

There is a great and undeniable advantage in a method which not only indicates quite clearly which curve represents the "correct" or standard cure, but which in addition, in the case of a cure which is not correct, indicates quite clearly what the correct cure should be.

Some examples are given below of "correct cures" obtained on the basis of a single preliminary cure. The rubbers consisted of various plantation grades (smoked sheet, pale crêpe, brown crêpe, and scrap). Some rubbers of an experimental type are also included.

EXAMPLES OF "CORRECT CURES," OBTAINED ON BASIS OF ONE PRELIMINARY CURE.

(Preliminary Cure in Each Case = 2 Hours, Except Where Otherwise Stated.)

Number.	Preliminary Cure. Figures. B. S.	E.	Time.	"Correct Cure." Figures. B. S.	E.
P.	1,592	9.95	1 hr.	1,786	10.03
M.	1,288	9.86	2½ hrs.	1,554	9.85
F.	1,521	10.94	3 hrs.	1,850	10.28
F. 1	581	10.78	4 hrs.	1,960	10.68
F. 2	798	10.46	3½ hrs.	1,260	10.12
F. 3	840	10.35	3½ hrs.	1,094	10.08
N.	1,484	11.34	2½ hrs.	1,515	10.72
F. 4	1,219	11.00	3 hrs. 5"	1,886	10.40
F. 5	1,204	11.00	3 hrs.	1,313	9.82
31 A. VIII.	2,380	9.81	1½ hrs.	2,345	10.50
31 S. VII.	1,341	9.33	1½ hrs.	1,554	9.86
36 S. VII.	1,198	11.2	2½ hrs.	1,642	10.57
77 S. XI.	476	10.0	3½ hrs.	1,700	10.40
79 S. XI.	460	9.58	3¼ hrs.	1,850	10.50
C. 48	1,660	10.2	1½ hrs.	1,900	10.40
38 S. X.	1,262	10.48	3 hrs.	1,579	10.20
W. 332 (3 h.)	2,058	9.27	2 hrs.	1,947	10.30
W. 333 (3 h.)	1,730	9.62	2¾ hrs.	1,770	10.10
W. 336 (3 h.)	2,072	9.64	2¼ hrs.	2,188	10.53
W. 338 (3 h.)	2,184	10.20	2½ hrs.	2,000	10.85
842a (2¼ h)	2,083	9.54	1¼ hrs.	2,160	10.75
841a (1¼ h.)	1,960	10.30	1 hr.	2,016	10.68
W. 344 (2½ h.)	1,477	9.8	3¼ hrs.	1,540	9.55
W. 352 (3¼ h.)	2,140	9.95	2½ hrs.	1,880	10.45
W. 354 (2¼ h.)	1,568	10.80	2¾ hrs.	1,946	10.36

Note.—B.S = Breaking strain (lb. per sq. inch). E. = Elongation at breaking (taking original length = 1).

CHEMICAL PATENTS.

THE UNITED STATES.

ELASTIC COMPOSITION comprising coarse rubber and a composition consisting of long-fibered cotton and high-grade rubber friction and skim; an alkaline earth; an oxide of one of the

§ "Journal of the Society of Chemical Industry," 1917, page 1261.
‖ "Journal of the Society of Chemical Industry," 1917, page 1261.
¶ Kratz and Flower. THE INDIA RUBBER WORLD, June 1, 1919, page 485.

true metals and a vulcanizing constituent. (Bela W. Rote, assigner to L. J. Weadock, both of Elyria, Ohio. United States patent No. 1,318,804.)

METHOD OF MANUFACTURING TIRE TUBES of layers of Japanese paper pasted together, coated with alcohol solution of resin and shellac and finished with a thick solution of india rubber on both the inner and outer surfaces. (Etsutario Ikeda, Tokio, Japan. United States patent No. 1,319,003.)

PLASTIC MASS RESEMBLING SOFT RUBBER OR LEATHER AND PROCESS, consisting in treating yeast with formaldehyde and subjecting the product resulting to the combined action of heat and pressure. (Ernst Krause, Steglitz, and Haus Blücher, Leipzig-Gohlis, Germany, assigners by mesne assignments, to the Chemical Foundation, Inc., New York City. United States patent No. 1,319,666.) (See German patent No. 314,728 granted to Hans Blücher, Leipzig.)

LEATHER SUBSTITUTE AND PROCESS OF MANUFACTURE. Sheets of fibres are saturated with a solution of a binding agent, dried and compressed, coated with rubber containing a vulcanizing agent and cured under heat and pressure. (Roland B. Respess, New York. United States patent No. 1,319,795.)

COMPOSITE SHEET MATERIAL consisting of a fibrous sheet impregnated with an oxidizing oil, textile fabric superimposed on one surface thereof, and a layer of elastic adhesive material uniting the fibrous sheet and fabric. (Alexis W. Keen and Pietro Frigeri, New York City, assigners to Rubber Regenerating Co., Naugatuck, Connecticut. United States patent No. 1,320,149.)

PROCESS FOR VULCANIZING RUBBER AND PRODUCTS OBTAINED thereby. A process for treating rubber or similar material which comprises subjecting the rubber to an organic dye adapted to produce oxygen and inducing vulcanization to take place under the action of said oxygen. (Iwan Ostromislensky, Petrograd, Russia, assignor, by mesne assignments, to New York Belting & Packing Co., New York City. United States patent No. 1,320,166.)

THE DOMINION OF CANADA.

RUBBER VULCANIZING PROCESS which comprises mixing dinitrobenzene and red lead with rubber or similar materials and vulcanizing the mixture. The patent also includes the vulcanized products of the action of red lead and dinitrobenzene. (The Canadian Consolidated Rubber Co., Limited, Montreal, Que., Canada, assignee of Sheldon P. Thacher, Weehawken, New Jersey. U. S. A. Canadian patent No. 193,394.)

THE UNITED KINGDOM.

COATING MATERIALS FOR FABRICS, ETC. Turkish birdlime is thinned with alcohol and used for rendering porous materials impervious, especially for making petrol tanks from porous materials such as canvas or from a material such as rubber, which is attacked by petrol. The birdlime is preferably treated with hot solution of borax or with hot water, then heated to 180 degrees F. and mixed gradually with the alcohol. To vary the consistency, diatomaceous earth shellac, or dextrine may be added. (C. A. Brackenside, Woburn Sands, Bedfordshire, and Gayner Pneumatic Co., 95 Cannon Street, London, British patent No. 130,379.)

OTHER CHEMICAL PATENTS.

GERMANY.

PATENTS ISSUED, WITH DATE OF APPLICATION.

NO. 1,319,032. Producing rubber soles for boots and shoes. M. H. Kurt Blitz, Neukirchen.

313,554. (August, 1917.) Process for reclaiming rubber. Dr. Wm. North and Hermann Looski, Hanover.

314,503. (September 21, 1917.) Process for reclaiming rubber shavings. Adolf Vorweck, Jr., Bremen.

314,560. (February 25, 1915.) Process for producing rubber-like hard and soft rubber. H. Otto Traun's Research Laboratory, Hamburg.

314,728. (November 20, 1915.) Process for making substances like soft rubber or leather out of yeast and formaldehyde. Hans Blücher, Leipzig.

315,321. (January 23, 1918.) Process for making highly elastic vulcanized substances out of synthetic rubber. Mitteldeutsche German fabrik. Louis Peter, Frankfort.

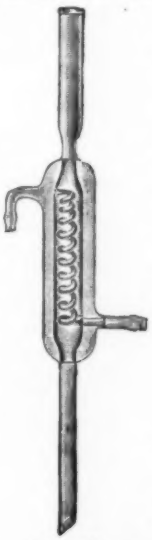
THE FRENCH REPUBLIC.

493,450. Process for making synthetic rubber. H. Jousse.
493,569. Process for making ebonite. R. C. M. Bayard de la Vingtrie.
493,634. Improvements in vulcanizing rubber and like substances. The Dunlop Rubber Co., Limited.
494,757. Process for removing the combined sulphur from vulcanized rubber. D. Spence.
495,013. Process for vulcanizing rubber objects. American Rubber Co.

LABORATORY APPARATUS.

AN EFFICIENT CONDENSER.

The Kobe Condenser has three sets of walls. The water for cooling enters through the upper side tube, thence it passes through the coiled inner tube and out by the lower side tube. The distillate enters the adapter at the top, passes through the expanded middle tube and out by the tube at the bottom.



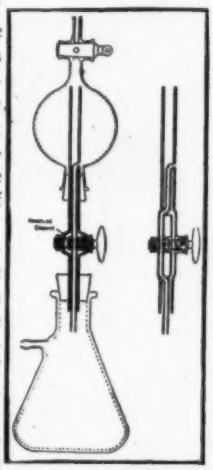
THE KOBE CONDENSER.

While in the apparatus the distiller is cooled in three ways; first, by the expansion of the middle tube; second, by the jacket of cold water around it; and third, by the cold tube coiled inside it.

A Kobe condenser of this type, with body six inches long, is as efficient as a regular Liebig condenser 35 to 40 inches long. It is especially recommended for liquids of low boiling points. (Eimer and Amend, Third avenue, 18th to 19th streets, New York City.)

PRESSURE-EQUALIZING STOP-COCK.

The special pressure-equalizing stop cock shown in the illustration was designed for use in connection with a generator for carbon dioxide which was to be used alternately with pressures below and above that of the atmosphere. In this new apparatus the connection is made by means of an annular groove in the key of the stop-cock so that there is always communication between the lower flask and that of the upper one.



STOP-COCK FOR EQUALIZING PRESSURE.

One arm of the stop-cock is extended until it opens above the liquid in the upper container. The liquid enters at an aperture in the lower part of this opening. Two different styles were made using the same principle in each. ("The Journal of Industrial and Engineering Chemistry.")

IMHOFF TUBE.

IMHOFF SEDIMENTATION TUBE.

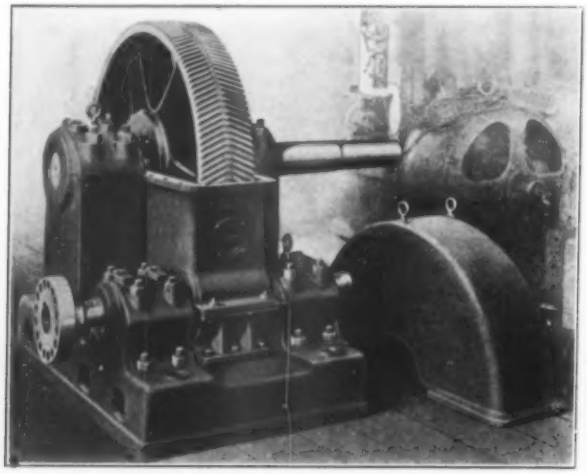
The Imhoff sedimentation tube for determining sediment in water and other liquids is shown in the accompanying illustration. It has a capacity of one liter graduated or divided as follows: up to 2 cc. in one-tenth cc.'s; from 2 to 5 cc. in one-half cc.'s and from 5 cc. to 4 cc. in single cc.'s. (Eimer & Amend, Third avenue, 18 to 19th streets, New York.)

New Machines and Appliances.

HERRINGBONE REDUCING GEAR DRIVES.

COMPLETE drive units consisting of a pair of herringbone gears and pinions enclosed in an oil-tight case for reducing the speed of an electric motor to mills or calenders are necessary equipment in every rubber mill. The accompanying illustration of a vertical calender drive shows the reducing gear commonly used to connect 66-inch calenders with 100 h.p. 950 r.p.m. motors.

The gears are made of furnace-annealed steel castings, the pinions, of hammered open-hearth steel forgings, are made integral with the pinion shaft, and the shafts are of open-hearth steel forgings. The low speed, or gear bearings are cast integral with the main frame and fitted with removable split shells of cast steel, babbitted. High speed, or pinion bearings consist of babbitted pillow blocks bolted to the frame. For rebabbitting or other repairs the pinion bearings may be readily taken down and the shells easily removed from the gear bearings. Genuine babbitt, or such other high-grade bearing metal as is most suitable, is used in all bearings. All bearings have oil ring lubrication, the oil being supplied by separate reservoirs below the gear and pinion shafts. Oil for lubrication of the gears is kept separate from that in the bearing reservoirs by throwers and retainers on the gear and pinion shafts.



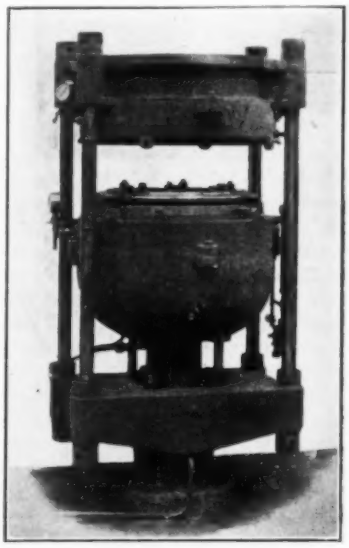
VERTICAL TYPE CALENDER DRIVE.

The main frames are made of iron castings of heavy section and proper dimensions to obtain rigidity. They are machined to carry the gear and pinion bearings in correct alinement, and are provided with foundation bolt holes of proper size.

Gear covers for all drives are entirely separate from the main frames, and form an oil reservoir for lubricating the gears. They are made of cast iron split horizontally in the center line of the gear and pinion shafts, and are machined and fitted together to obtain oil tightness. Covers are attached to the main frame in proper position by means of machine bolts. Oil gages, oil drains, also inspection and oil supply openings, are provided. (Fawcus Machine Co., Pittsburgh, Pennsylvania.)

HYDRAULIC BICYCLE TIRE PRESS.

The use of the formerly plebian bicycle is said to be rapidly increasing in popularity and in consequence bicycle tire makers are planning to increase materially their future production. However that may be, the accompanying illustration of a British press-vulcanizer, with its novel features is of more than passing interest.

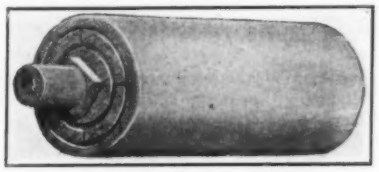


BICYCLE TIRE PRESS VULCANIZER.

The press is made in two sizes for 26 and 28 inch bicycle tires. It is operated by two rams one of which closes the press and at the same time the other automatically expands the collapsible core which is made in eight segments. The loose tread ring for forming the pattern of the tire is not shown in the picture, but is fitted to the columns and is easily changed to enable the same side rings and core to be used with varying tread rings to produce any desired patterns. The time of vulcanization varies from five to seven minutes. (Francis Shaw & Co., Limited, Manchester, England.)

SOLID WOODEN SHELLS.

The wooden shell formerly universally used in rubber factories was built in two pieces held together by glue and dowels reinforced at the ends with flat iron rings held in place by screws. Such shells frequently fell apart and have been practically superseded by metal shells.



WOOD CALENDER SHELL.

Solid wooden shells turned and bored from one piece and reinforced against splitting by special cast rings sunk deeply into the ends, are made for the rubber manufacturing trade and other industries. They may be used either with wooden or metal center bars and are found very satisfactory. (Adolph Martin Sons, Inc., Passaic, New Jersey.)

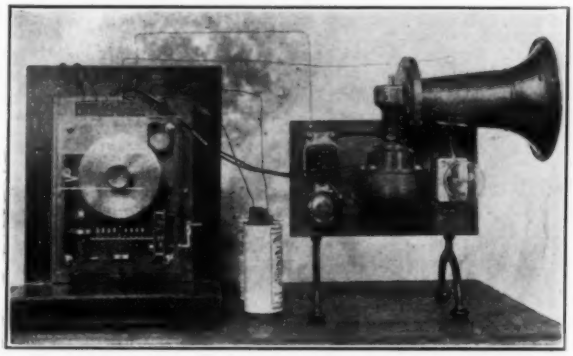
A NOVEL FACTORY SIGNAL.

The Klaxocator is an electrical code calling mechanism which will signal either audibly with horns, bells or whistles, or by electric lamps placed at any number of points throughout a factory. Its operation is entirely automatic after it has been set for a given code number by the operator.

While it is used chiefly for summoning officials, department heads and production foremen to the nearest telephone, it may be utilized for fire alarms, danger warnings, as an extension to telephone bells in noisy places, for signals between departments, for sounding the time of beginning and stopping work, or giving warning that power, light or water is to be cut off.

These code signals are sounded simultaneously at as many points as signal stations are installed, or shown by lights, ac-

cording to the character of equipment. Horns used with the device are similar to the well known electric auto horns and vary in shape according to whether it is desired to scatter the sound, to intensify it in a horizontal direction, or to deflect it downward. The horns are connected to an available 110 or



THE KLAXOCATOR.

220-volt circuit, either direct or alternating current, while only a small current from a few dry cells is used in the central instrument.

When it is desired to call some person, the operator sets the desired person's code number on the dial and pulls a lever. The contact shaft is set in motion instantly by the spring and the circuit is closed a certain number of times in accordance with the position of the code drum. Every time the battery circuit is closed the relay closes the power circuit and operates all the horns, whistles, gongs and lamps connected to it. Having sounded the complete call three times, the number indicator returns to its original position and the mechanism is ready for the next call. Numbers may be sounded as many as three times if desired. (The Klaxon Co., 1 Madison avenue, New York City.)

ELECTRIC SPACE HEATERS.

This is a steel-jacketed heater of special design intended for heating crane cabs, out houses, valve, pump and meter houses. In rubber mills there are undoubtedly many places where this device can be used to advantage in winter weather.

C-H SPACE HEATER.

Each heater has a capacity of 500 watts and may be connected to any direct or alternating current lighting or power circuit of 115, 230, or 250 volts pressure. These heaters can be mounted in groups or singly at different locations and additions may be made as easily as adding electric lamps. The heaters are flat like an ordinary ruler, the thickness being 3/16-inch, the width 1½ inches, and the length 24 inches. (The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin.)

CIRCULAR MANDRELS FOR CURING INNER TUBES.

The principal advantages claimed for inner tubes that are cured on circular mandrels are that they conform to the shape in which they are used in the casings, meaning a more uniform thickness in the volume of rubber used and resulting in a tube of much better lasting quality.

The illustration shows a popular type of a circular tube-curing mandrel before the tube is applied, and the spring-controlled section explains how the mandrel is made practically endless.

These mandrels are made in all sizes, from 3 to 12 inches in section, the 6-inch size and larger being particularly advantageous, due to their comparative lightness. (The Republic Tool & Manufacturing Co., Cleveland, Ohio.)

CIRCULAR TUBE CURING MANDRELS.

MACHINERY PATENTS.

MACHINE FOR APPLYING RUBBER CEMENT.

THIS MACHINE applies cement in a semi-automatic manner to rubber clothing, gas masks and other articles made of rubber.

A front elevation of the machine, partly in section, is shown in Fig. 1 and comprises a frame and table similar to an ordinary sewing machine. An endless belt *A* runs over a bridge *B*, provided with a depression or groove in its upper surface, and detachably resting on the privoted angular pieces *C*, *C*, which may be swung away from the belt pulleys as indicated by the dotted lines on the left.

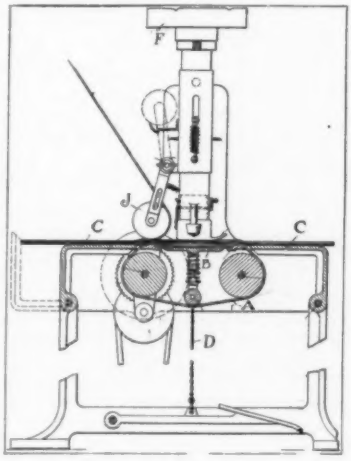


FIG. 1. ELEVATION PARTLY IN SECTION AT RIGHT ANGLE TO THE PLANE OF FIG. 2.

Chain *D* is connected to a treadle at the base of the machine, and passing through the angular arm, connects with the pivoted lever *E* (See Fig. 2) that bears against the bottom of the cement receptacle *F*, which is fastened to the cement chute *G*, sliding within an outer tube that is forced away from the angular arm by a powerful spring *H*. Thus, when the treadle is depressed the cement chute is raised and by spring action is forced away from the belt *A* to the position shown in Fig. 2.

In applying cement to objects of irregular outlines such as gas masks, the object is placed under a cam-shaped pattern and when revolved, the cam follower attached to the cement chute evenly distributes the cement. For straight seams the cement chute is used in combination with the belt *A* as shown in Fig. 3. In applying cement to endless objects such as cuffs of rain coats the angular pieces *C*, *C*, are swung out of place and the object to be cemented is slipped laterally over the belt *A* (See Fig. 1). When cement is to be applied to adjacent overlapping edges of two objects, the fabric is forced into the depression in the bridge *B* by the cement chute, forming an angular configuration, so that both of the overlapping edges are cemented in an equal manner. (See Fig. 1.)

In order to cement pieces of fabric together, the tape shown in Fig. 1 is led from a reel to a roller *J*, that applies the tape

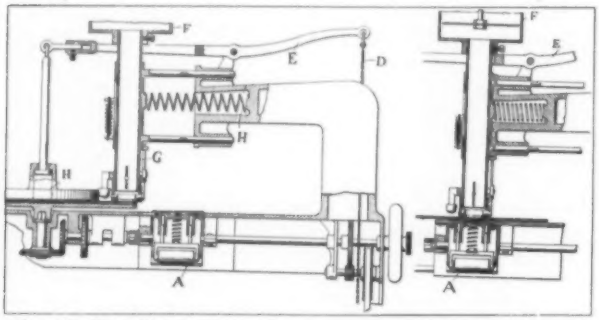


FIG. 2. SIDE ELEVATION. FIG. 3. DETAIL OF SIDE ELEVATION.

to the cemented fabric in passing. (Hirsh Milkewitz, Louis Gelacie and Saul Gelaru, New York, N. Y., United States patent No. 1,318,683.) Patent No. 1,318,661 granted to the same inventors covers features in the same machine.

OTHER MACHINERY PATENTS.

THE UNITED STATES.

NO. 1,317,848. Press for retreading tires. J. J. Wohlgemuth, Chicago, Illinois.

1,317,849. Press for molding and vulcanizing tires. J. J. Wohlgemuth and L. L. Korach, Chicago, Ill.; said Korach assignor to said Wohlgemuth.

1,317,850. Tire mold. J. J. Wohlgemuth, Chicago, Ill.

1,317,904. Tire mold. F. E. Anderson and D. S. Erickson, Osage, Kans.; said Anderson assignor to said Erickson.

1,318,113. Combined testing and inflating gage for tires. H. A. Scott, Berkeley, Calif.

1,318,273. Apparatus for vulcanizing tires. F. D. Goodlake, Memphis, Tenn.

1,318,383. Retreading apparatus. W. H. Hermsdorf, assignor to S. H. Goldberg—both of Chicago, Ill.

1,318,530. Tire-retreading mold. J. Bjurstrom, St. Paul, Minn.

1,318,643. Apparatus and method for rolling tire bead cores. J. L. Butler, Akron, O., assignor to The B. F. Goodrich Co., New York City.

1,318,661. Machine for cementing garments. S. Gelarie, H. Milkewitz and L. Gelarie—all of New York City.

1,318,685. Tire-banding machine. H. I. Morris, San Diego, Calif.

1,319,088. Air-bag for tire repairing. A. L. Johnson, Worcester, Mass.

1,319,287. Tool for trimming solid rubber tires. G. H. Johnson, Los Angeles, Calif.

1,319,301. Machine for slicing tread stock from tires. E. Nall, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.

1,319,333. Stitching apparatus for tire-making machinery. W. B. Harsel, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.

1,319,338. Machine for buffing inner tubes, etc., C. D. Hibbs, Fort Worth, Tex.

1,319,887. Apparatus and process for making hose by impregnating tubular fabric with balata solution. C. R. Griffith, Portland, Ore.

1,319,644. Core for tires. G. H. Chinnock, New York City.

1,319,695. Machine for making cord tires. F. B. Converse, Akron, O., assignor to The B. F. Goodrich Co., New York City.

1,319,770. Expansible core for vulcanizing tires. A. Hargraves, Akron, O. (Application renewed August 8, 1919.)

1,319,982. Wrapping machine. C. R. Wieczoreck, Union Hill, N. J., assignor to Peerless Rubber Manufacturing Co., 1790 Broadway, New York City.

1,320,015. Sectional mold for tires. H. V. Lough, assignor to The Hartford Rubber Works Co.—both of Hartford, Conn.

1,320,021. Machine for forming tire molds. W. A. S. Mauk, Baltimore, Md.

1,320,128. Rubber mixer. B. J. Felix, Chicago, Ill.

1,320,295. Machine for making tire carcasses. W. C. Tyler, Racine, Wis., assignor to The Goodyear Tire & Rubber Co., Akron, O.

1,320,319. Tire-building machine. J. J. Convery, New York City, assignor to Kelly-Springfield Tire Co., Akron, O.

1,320,334. Machine for calendering vulcanite bases for solid rubber tires, C. Macbeth and H. Willshaw, Birmingham, assignors to The Dunlop Rubber Co., Limited, Westminster, London—both in England.

THE DOMINION OF CANADA.

193,091. Machine for winding balls. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of H. Z. Cobb, Winchester, Mass., U. S. A.

193,179. Apparatus for making tire casings. E. Hopkinson, 1790 Broadway, New York City, U. S. A.

193,356. Spreader for tire valves. H. P. Kraft, Ridgewood, N. J., U. S. A.

THE UNITED KINGDOM.

130,440. Apparatus for applying tread to foundation band of solid tire. Dunlop Rubber Co., 14 Regent street, Westminster, and C. Macbeth, Pará Mills, Aston Cross, Birmingham.

130,459. Sectional mold for tires. E. Hopkinson, 1790 Broadway, New York City, U. S. A.

131,311. Apparatus for shaping tire covers. E. Hopkinson, 1790 Broadway, New York City, U. S. A.

131,407. Device for opening tire molds and carrying tires on cores out of contact with shells after separation. Dunlop Rubber Co., 14 Regent street, Westminster, and C. Macbeth, Pará Mills, Aston Cross, Birmingham.

131,737. Machine for attaching two-section heels to boots, one section being rubber, etc. British United Shoe Machinery Co., Union Works, Belgrave Road, Leicester. (United Shoe Machinery Co., 205 Lincoln street, Boston, Mass., U. S. A.)

131,760. Apparatus for simultaneously forming tires of different diameters. Dunlop Rubber Co., 14 Regent street, Westminster, and C. Macbeth, Pará Mills, Aston Cross, Birmingham.

GERMANY.

308,622. Press for belting and similar materials. Oskar Skaller, Berlin.

314,148. Mechanism for attaching treads to tires. Lorenz Klingler, Nürnberg.

317,144. Press to mold plastic masses. Edmund Müller, Hemeling, Bremen.

PROCESS PATENTS.

THE UNITED STATES.

NO. 1,319,032. Producing rubber soles for boots and shoes, M. H. Clark, Hastings-on-Hudson, N. Y., assignor to Boston Rubber Shoe Co., Malden, Mass. (Continuation of application Serial No. 878,935, filed December 24, 1914.)

1,319,575. Rebuilding tires by combining, adding new material, vulcanizing, etc. W. D. Druse, Farmington, Mo.

1,320,121. Tire manufacture. F. F. Brucker, assignor to The Miller Rubber Co.—both of Akron, O.

THE DOMINION OF CANADA.

193,150. Waterproofing garments after seaming. W. S. Barker, Cambridge, Mass., U. S. A.

THE UNITED KINGDOM.

129,298. Securing porcelain and similar fittings to rubber articles such as necks of water bottles, etc. A. B. V. and H. F. Taffs, trading as H. F. Taffs & Co., 46 Farringdon street, London.

130,168. Manufacture of tire casings. E. Hopkinson, 1790 Broadway, New York City, U. S. A.

130,578. Manufacture of tennis balls. A. G. Spalding & Bros., 126 Nassau street, New York City, assignees of A. T. Saunders, Chicopee, Mass.—both in U. S. A. (Not yet accepted.)

130,615. Manufacture of tennis and similar balls. Tokasago Gomu Taabuskiki Sawais ha. 1000 Oh-Aza Zoshigaya, Takata-Mura Kitatoshima-Gun, Tokio. (Not yet accepted.)

131,416. Application of labels to silk neckwear, etc., by rubbber cement, heat, etc.

THE FRENCH REPUBLIC.

490,742. Improvements in the manufacture of tire casings. E. Hopkinson, 1790 Broadway, New York City, U. S. A.

20,816/491,352. First certificate of addition to patent dated December 9, 1915, for process and apparatus for inhaling and absorbing volatile products, fumes, and noxious gases. R. Bataille.

AUSTRALIA.

To Americans.

9,887. Vulcanizing rubber half-sole to fabric reinforcing strip to permit attaching toboots or shoes by stitching without liability of pulling out. F. A. Nolan, Minnesota, U. S. A.

GERMANY.

307,173. (February 21, 1917.) Process for making textiles impregnated with rubber. Wilhelm Deutsch, Vienna. (Austrian patent.)

308,277. (October 20, 1915.) Process for repairing rubber tires. Ludwig Victora, Heusenstamm in Hesse.

312,009. (March 18, 1916.) Process for making tires and preventing skidding. Karl Racher, Seebach, bei Villach (Austrian patent of December 1, 1915.)

313,281. (May 9, 1918.) Process for laying on rubber. Wilhelm Sachs, Berlin.

315,342. (December 20, 1918.) Process for giving a smooth surface to objects made from reclaimed rubber. Marie, widow Richter, born Haasmann, Dresden.

RUBBER EXPORTS FROM LONDON, ENGLAND, TO THE UNITED STATES from January to July, 1919, aggregated $9,280,243, as compared with $3,732,799 for the first seven months of 1918. The increase of rubber exports is particularly noticeable.

New Goods and Specialties.

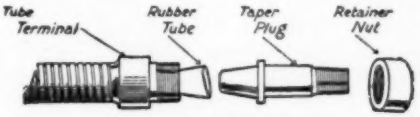
THE "HOLD-NO-FONE."

EVERY NOW AND THEN some inventive mind develops a new form of telephone. While the principles involved are the same, as far as the transmission and receipt of messages are concerned, the outer form of the equipment may vary widely. The one here illustrated obviates the necessity for using the hands in any way in operating the device, once the connection has been made. A flexible horn is placed directly over the receiver, fastened by a spring. The receiver, with horn attached, is fastened to the telephone post and adjusted for either ear. The ear-piece is fitted with a soft rubber cushion, and a small weight fastened to the receiver hook makes and breaks connection when placed in position, leaving the hands entirely free for writing, holding papers, etc. At the same time the rubber ear-piece shuts out interfering local sounds. This device has been patented in the United States, the last patent having been granted during the present year. (Hold-No-Fone Co., 295 Fifth avenue, New York City.)

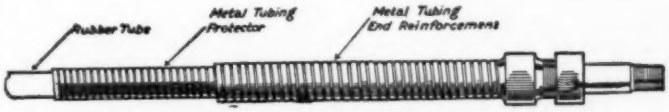
TELEPHONING WITH FREE HANDS.

"FLE-X-MET" TUBING.

The disadvantages of using rubber tubing protected by only a comparatively thin covering of silk, cotton, or other material easily punctured or burned, resulted in the development of the tube or hose proteced by metal, necessarily in flexible form. One of the more recent styles is shown in the accompanying illustrations, which indicate, in addition to the flexible metal covering, the appearance of the tube terminal, taper plug, and retainer nut. (Breeze Manufacturing Co., Newark, New Jersey.)



A. T. F. "FLE-X-MET" AIR HOSE.



ASSEMBLED FLEXIBLE METAL HOSE.

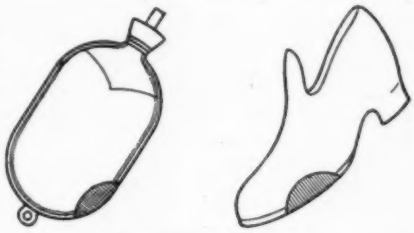
A SHOE FOR WORK-PEOPLE.

The high price of leather footwear and the indisposition of shoe manufacturers to make strong, substantial shoes of the working-man type, have given rubber footwear manufacturers an opportunity to provide for the class that needs serviceable yet inexpensive footwear. The "Craftsman" shoe shown here is made with uppers of extra strong duck, in either white or brown, with the seams reinforced with leather. It has a rubber heel, a sole of red fiber and rubber, a liberal foxing, and a special insole. Such a shoe gives comfort and service at a price low enough to bring it within reach of mechanics and other workers. It is made both high and low cut, and in men's and women's styles in all sizes, the smaller with spring heels. (La Crosse Rubber Mills Co., La Crosse, Wisconsin.)

THE "CRAFTSMAN" SHOE.

"REPAIRO" SELF-VULCANIZING PATCH.

A new rubber patch, which can be used by the amateur in mending articles of rubber or leather, is represented herewith. The patch is cut to fit over the hole and is applied by means of the "Repairo" self-vulcanizing solution accompanying the outfit, after the surface of the article to be repaired has been roughened around the break or hole with sandpaper. (The Repairo Co., 39 West Adams street, Chicago, Illinois.)



THE "REPAIRO" PATCH.

"DUXRANE" FOR AUTOMOBILE TOPS.

A new material for automobile tops is called "Duxrane." It is made of single-ply rubberized fabric and will, it is claimed, stand the test of scrubbing, wrinkling, and rubbing, without sagging, cracking, or fading. The coating is extra heavy, which contributes to its beauty. (O'Bannon Corp., 200 Fifth avenue, New York City.)

"EAGLE" PUNCTURE-PROOF TIRE.

In THE INDIA RUBBER WORLD for April 1, 1919, on page 369, appeared an illustrated description of a wheel equipped with the "Eagle" puncture-proof tire. The design has since been considerably changed in application, but the theory has been retained. The two pneumatic tires have been altered from the former round shape to one that is round on top and pointed at the bottom, while the shape of the bottom of the solid rubber tire at the tread has been changed to fit the newer design. All three tires are now brought closer together. The solid tire upon which the wheel runs is vulcanized to a demountable steel rim, which is placed between the solid and the pneumatic tires. (The Eagle Puncture-Proof Tire Co., Inc., 1662 Broadway, New York City.)

THE "NEVER-LOOSEN" HEEL.

One of the newest heels is of solid rubber with a pneumatic suction space in the side applied to the shoe and a non-slip plug in the bottom. The unique feature of the "Never-Loosen" heel consists of a rand of fiber and rubber vulcanized to the heel when manufactured. By means of this rand the heel can be properly held in place

JONES "NEVER-LOOSEN" HEEL.

by nailing, without cement or washers. (Jones Never-Loosen Rubber Heel Corp., 13 Park Row, New York City.)

FOR HOLIDAY TRAVEL.

A woman traveling in the holidays desires a toilet case as dainty as the home visited. For such the accompanying picture shows a silk outer case, plaided in pleasing colors, which contains a removable, rubber-lined easel with pockets to accommodate the toilet accessories. These include comb and brush, tooth brush, cold and dental creams, face cloth and soap, sandpaper strips, orange-wood stick, nail brush, powder puff in powder box with mirror inside, a convenient mirror with easel back, and a paper of hair pins. The flaps on the pockets have loops of silk cord and the case itself fastens with loops over crystal buttons. There is a suitable hand strap for carrying, and a loop on the lining case by which that may be withdrawn from the outer one.

PLAID TRAVELING CASE.

PURSE-LIKE TOBACCO CONTAINER.

The container for tobacco and cigarette papers, shown in the photograph, is lined with rubber to preserve the natural moisture of the tobacco which may be within. There is a small pocket to accommodate cigarette papers, and the whole folds together like a purse and is held by a strap and snap fasteners. The case may be had in black fine-grained seal or tan pigskin, black cobra seal, or brown pin seal. It is five and one-half by four inches in size. Initials may be stamped above the fastener if desired.

NEW TOBACCO POUCH.

Both the cases are from the same house. (Mark Cross Co., 404 Fifth avenue, New York City.)

AUTOMATIC BARREL FILLER.

Garage men and others handling lubricating and other kinds of oil find a barrel filler a great convenience. One that is also automatic should meet with additional favor. That represented here includes the automatic feature and is fitted with three and one-half feet of metal-lined hose one and one-quarter inches in diameter. The automatic barrel filler may be had in larger and smaller sizes by those who desire, equipped with different lengths of hose. Fittings that are suitable for attaching the hose to the source of supply are included with the hose. (United Metal Hose Co., Inc., 89 Chambers street, New York City.)

"UNITED" AUTOMATIC BARREL FILLER.

RADIO HEAD SET FOR AIRPLANES.

In order to secure for radio equipment on airplanes a head set that would exclude the noise of the propeller and the effect of the rushing air, there was devised a form of aviator's helmet with telephone receivers mounted in it so as to fit the ears of the pilot or observer. A portion of it fits the face closely to prevent sounds other than the ones originating in the receiver from being heard by the wearer of the apparatus. A receiver is furnished for each ear, but instead of the hard-rubber ear-pieces, there are caps of sponge rubber. The receivers are held in place by means of the padded leather which composes the helmet, while adjustment is made by lacing the helmet to fit closely the wearer's head. The exclusion of sound is not so complete as to prevent the user from hearing the exhaust from the engine and thereby determining whether or not his motor is working properly.

RADIO HEAD SET; RUBBER EAR-CAPS.

A RAPSON NON-SLIP UNPUNCTURABLE TIRE.

A RAPSON TIRE.

Fred L. Rapson's development of the non-slip unpuncturable tire is composed of a heavy-tread cover and inner air tube, between which is inserted a rubber deflector so designed as to insure the greatest possible degree of resiliency. Containing, as it does, scientifically planned air pockets, the inner tube is protected and assured of cool running. The tires are made in nine sizes, including one for motorcycles, and are fundamentally pneumatic tires, but freed from the annoyances to which the use of ordinary pneumatics subjects the user. There are several different combinations of the component parts, one form of which requires a special rim and wheel, but in another which is suitable for fitting to existing rims, the tube lies close to the rim but not in contact with it and has the resilient rubber core around it on the sides and outer diameter. (Oylers, Limited, 35 New Cavendish street, London, W. 1, England.)

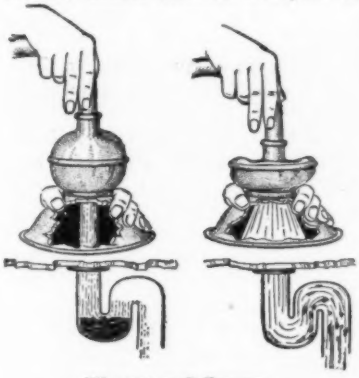
"JIFFY" GOLF-BALL RENEWER.

"JIFFY" FOR GOLF BALLS.

A compound for painting golf balls and the hangers for doing it efficiently without soiling the hands, will surely make a strong appeal to all who find pleasure in driving "little white pellets over the grass." The "Jiffy" compound, used with its accompanying stabilizer, will coat any ball and dry so quickly, it is claimed, that the ball can be put in the pocket in fifteen minutes and used on the golf course in an hour. (The Pittsburgh Economy League, Pittsburgh, Pennsylvania.)

THE "HYDROMATIC" DRAIN-PIPE FLUSHER.

A simple device for clearing obstructed drain pipes and maintaining them free from obstruction thereafter is embodied in the sanitary flusher pictured herewith. It is made of rubber, and all parts are interchangeable and replaceable when worn out. A rubber bell and patented aerostatic bulb combined is attached to a short length of rubber hose; this, in turn, is attached to a rubber connector which fits any faucet. A chain holds the connector firmly to the faucet when the pressure is on. The force of the water pressure cleans out the waste accumulated in the trap of the drain pipe, and the aerostatic bulb multiplies this pressure when the condition requires. Daily use of this flusher for one minute, it is claimed, will keep the pipe from ever becoming clogged. (The Bunker Hill Rubber Works, Bunker Hill, Illinois.)

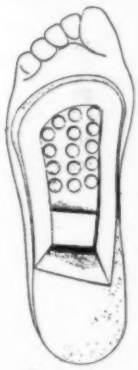


"HYDROMATIC" FLUSHER.

"JIFFY" BABY PANTS.

The newest patent on baby pants made of rubber is represented in the illustration at the right. This is a one-piece all-rubber garment with elastic cemented within the hems at the waist and legs so that all strings and buttons are dispensed with. (I. B. Kleinert Rubber Co., 719 Broadway, New York City.)

RUBBER BABY PANTS.



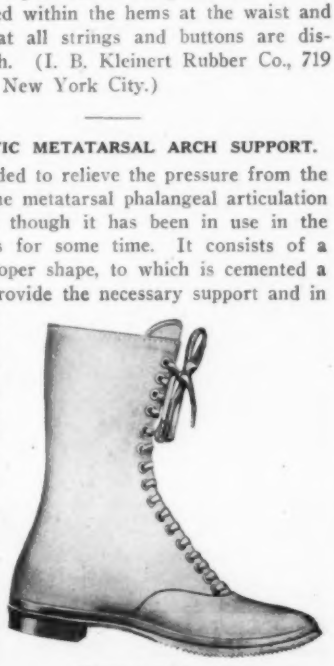
BOONE ARCH SUPPORT.

PNEUMATIC METATARSAL ARCH SUPPORT.

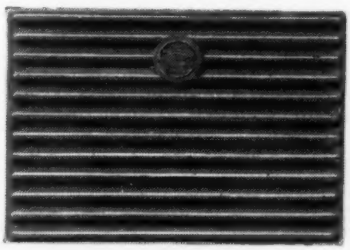
A new arch support intended to relieve the pressure from the ball of the foot and raise the metatarsal phalangeal articulation has been recently patented, though it has been in use in the better grade of shoe stores for some time. It consists of a leather inner sole of the proper shape, to which is cemented a piece of rubber shaped to provide the necessary support and in which are a number of small vacuum cups to give the pneumatic effect. These supports are made to fit all sizes of men's and women's shoes and are carefully marked "right" and "left." (Estate of Selden H. Boone, George T. Kimmel, administrator, Chicago.)

THE "PASTIME" OUTING BALMORAL.

The high cut outing Balmoral pictured here is the result of a demand for high-laced footwear for real service in summer. It is made of a superior quality of bleached white duck, with white rubber foxing, the latter being narrow and inconspicuous. The shoe is quite high, with 16 pairs of white enameled eyelets. The sole and heel are of white rubber, of a tough and serviceable quality. The heel is of comfortable walking height. The shoe is one which will commend itself for pedestrian service on summer outings, as well as for street wear. (Gutta Percha & Rubber, Limited, 47 Yonge street, Toronto, Ontario, Canada.)



"PASTIME BALMORAL."



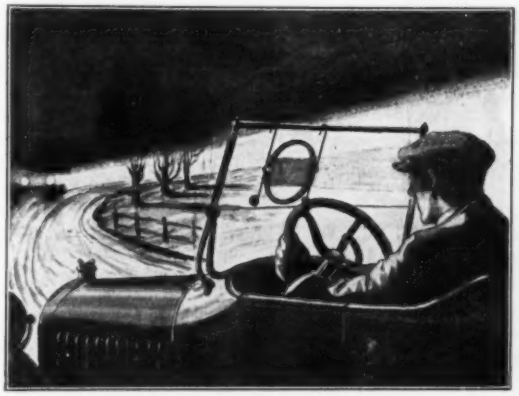
"MARATHON" RUNNING BOARD MAT.

AUTOMOBILE MATS.

To prevent the tracking of mud, dirt and grease into the automobile from the running board and to guard from wear the floor covering below the accelerator pedal, rubber mats are now used with considerable satisfaction. The "Marathon" mat illustrated is intended for the running board and is 11½ by 8 inches in size, but a smaller one, half as wide, is provided for the floor under the accelerator pedal. (The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.)

THE "ANTIGLARE" FOR AUTOMOBILES.

A contrivance which permits the automobile driver to derive the full benefit of the lights on his own car while protected from the glare of approachihng lights on other cars is shown herewith as it appears in use. It is constructed of glass and metal to fit any windshield. The tops of the upright rods have hooked ends to fit over the edge of the windshield and the bottom ends are equipped with rubber suction cups which assist in holding the device in place. The "Auto Antiglare" may be used for either right or left hand driving and the glass can be raised or lowered. (The Portland Sales Company, Inc., 167 Oliver street, Boston, Massachusetts.)



THE "AUTO ANTIGLARE."

"DIAMOND GRIP" RUBBER HEEL.

"DIAMOND GRIP" HEEL.

A new rubber heel has a cone-shaped portion sunk in the middle on the reverse side, while on the bottom is a diamond-shaped knurled portion immediately under the cone. This device provides automatic action said to prevent slipping. The heel is called the "Diamond Grip Don't Slip." (Robert E. Miller, Inc., 11 Broadway, New York City.)

Los Angeles Challenges Akron.

By Frederic North Shorey.

WILL the axis of the rubber manufacturing industry one day be shifted from Akron to Los Angeles? That is what Pacific Coast business men predict and the Goodyear Tire & Rubber Co.'s $20,000,000 factory rapidly moving toward completion furnishes a basis for their optimism. They are confident that other rubber companies will be prompt in following and that soon rubber factories will be as common as the citrus groves and vineyards of Los Angeles. They are already mentally arranging locations for up-to-date plants that will turn out rubber footwear, clothing, insulated wires and cables, mechanical rubber goods, hard rubber, in fact all of the varied lines of the gum elastic product.

First among the advantages of Los Angeles is the climate which enables a factory manager to keep his plant going all the year around without the incidental troubles of heating to be considered. Where an eastern plant would, perhaps, be hampered by storms and inclement weather, a plant in southern California could run all the year around, a most important consideration as the overhead item of heating is reduced to a minimum.

The local market of southern California should not be overlooked as Los Angeles alone has a large number of stores, all of which handle rubber goods of every kind and description. There are eight dental supply houses, ten dental laboratories, 550 dentists, fourteen wholesale druggists and 300 retail druggists, all of which deal extensively in rubber goods. This does not include the populous and rapidly growing beach cities, such as Long Beach, Santa Monica and aristocratic Pasadena. There are at least 100,000 visitors every season to Los Angeles, including wealthy invalids from all over the world. The lighting and power companies adjacent to Los Angeles use thousands of miles of insulated wire which a local company could supply, while the housing problems for employes can be solved much easier than in any of the more populous eastern centers. Aside from local enthusiasm, there are sound reasons back of the Goodyear company's move, which apply equally to other great industrial enterprises, and particularly those making rubber goods. Some of these may well be presented for the consideration of other manufacturing concerns, which perhaps too long have been anchored in the more populous centers of the East.

In the first place, the population of the Pacific Coast is growing more rapidly than any other portion of the United States, and with it the rubber trade. Only two states in the Union exceed California in the number of automobiles and trucks used. These are Ohio with 417,400 automobiles registered in 1918, and Illinois with 389,135, while California is a good third with 351,863, and the first two states mentioned have double the population of California. Even New York has only 253,588 machines and Pennsylvania, 370,110. So the use of automobiles in California, and especially around Los Angeles, creates a large demand for tires.

Regarding the advantages of Los Angeles itself, there is an abundance of good factory sites in almost any direction from its center, probably as good as that selected by the Goodyear company. The question of fuel is easily disposed of, as the city is

VIEW OF A PORTION OF THE WORK BEING DONE ON THE PLANT OF THE GOODYEAR TIRE & RUBBER CO., OF CALIFORNIA AT LOS ANGELES.

in the midst of an oil district, one of the biggest storage stations of the Standard Oil Co. being located but a few miles from the city limits on the coast, to which the oil is piped from the various wells by a pipe line. Efforts are now being made by the Standard and Union Oil companies to increase their product, drilling for new wells going on constantly. There are a number of oil wells in Los Angeles itself, only a short distance from the postoffice.

A large part of the crude rubber used in the United States now comes directly from the Far East through Pacific ports, to be transported to the rubber centers of the East. This extra haul can be avoided if the rubber is sent to factories located in Los Angeles. Moreover, the line from the Far East by way of Los Angeles over the southern roads is better than the route by way of Seattle and the railroads from Seattle to Akron, where in winter-time snow, ice and congestion seriously interfere with transportation. Thus, a continued flow of traffic may be

MEMBERS OF THE GOODYEAR TIRE & RUBBER CO.'S OFFICE FORCE AT LOS ANGELES, NOVEMBER 1, 1919.

obtained at a lower cost than is possible over the northern routes. It is also within the realms of probability that the "machine grown rubber" from California, Arizona and Texas will one day furnish another reason in favor of Los Angeles. The natural center for cotton shipments coming from the Imperial and San Joaquin valleys and the rapidly growing fields of Arizona, is Los Angeles. In addition to this it has preferential rates from all Texas points for export cotton. The Goodyear company takes advantage of this nearness to the cotton fields by the establishment of its cotton factory for the manufacture of fabric to be used in its tire industry. Furthermore, sulphur, talc, asbestos and many other ingredients used in rubber compounding are to be found within our own borders and will be available upon demand.

As for outlets for manufactured goods in addition to the local market there is the overseas market, Japan, China, Oceanica, Australia and India. So also the east and west coast of South America, South Africa and even Europe are more accessible than they are in Akron.

The harbor facilities of Los Angeles are particularly advantageous for industrial enterprises. It is declared that freight can be handled there at 10 per cent less than in any other port on the coast. The United States has spent approximately $6,000,000 on the breakwater, jetties and dredging in the harbor, and wharves, freight sheds, warehouses, railroad terminals, paved streets and other facilities have been constructed for the economical handling of freight.

It is claimed that the largest and perhaps the finest pier in America has been built in the outer harbor. It is more than half a mile long and 650 feet wide. It was constructed by building a rock bulkhead around the area and filling in the center with solid earth dredged out of the harbor in digging channels. These channels were made 35 feet deep on each side of the pier.

A reinforced concrete wharf 2,500 feet long and 40 feet wide was built along the west side of this pier, and a freight shed of steel and asbestos-protected metal was built on and back of this wharf. More than two miles of railroad tracks and a paved street were built to serve this wharf and shed.

Last, but not least, among the city's biggest assets are its open-shop policy and traditions. When the longshoremen's strike tied up the San Francisco water front and sent vessels to Los Angeles to be unloaded dock work went ahead here uninterruptedly, in spite of the strike. Free labor has always been insisted upon, and attempts at strikes, whether by agitator elements, within or without the city, have invariably proved failures, as witness the recent attempt to cut the city off by a railroad strike in sympathy with the carmen's strike in that city, both of which were called off, after it was seen there was no hope of success. A shipbuilding strike at the yard in the harbor, which lasted for several months, was also called off, the agitators who had stirred up the trouble abandoning their efforts in disgust.

Los Angeles County alone has 107,000 automobiles and 15,000 trucks, fully one-third of all those in the State. There are 75 automobile agencies in the city, representing all the standard makes of machines made in the United States, 250 garages and over 200 tire agencies, to say nothing of oil stations, electric service stations and the like. The county highway system has 470 miles of good roads and the city 1,500 miles of paved streets. Southern California itself has 2,368 miles of paved highways and 10,000 miles of highly improved roads extending from Los Angeles to the Mexican border and to the northern extremities of the State. The State itself purposes to improve this system greatly in the coming year through the $40,000,000 bond issue voted at the last election.

There are reports that other rubber companies, following the example of the Goodyear company, are already negotiating for sites, but no definite announcement has yet been made. Three other rubber companies have plants located in southern California, all in the vicinity of Los Angeles; the Hendrie Tire Co. at Torrance, the industrial city in close proximity to the harbor; the Samson Tire & Rubber Co. at Compton, a suburban town on the line of Long Beach, and the Savage Tire Co., with its main plant at San Diego, and a branch in Los Angeles.

PRACTICAL HINTS ON RETREADING.

By A. B. Zwebell.

A RECENT TRIP through the East afforded the writer an opportunity to observe the manner in which the business of tire retreading is carried on. It was noticeable that some repair men are careless in their work and reckless in guaranteeing poor workmanship, while others waste time and work on worthless tires, all of which brings retreading into disrepute. Therefore, some practical suggestions which should be helpful to all who engage in the industry of retreading tires may be of interest.

The first step toward a successful business is to pick out first-class tires to retread or to substitute such tires as are worth retreading. First-class work is essential and it may pay in the end to reject two-thirds of the tires brought in for retreading, if they are of poor quality. The tire should be of standard make for these are made of material of good quality and are usually suitable for retreading. A good cord tire, such as are becoming rapidly more popular, invariably wears out the original tread. The added cost of a cord casing makes the owner try to economize by turning to retreading.

Moisture in a carcass is very detrimental to retreading a tire. The carcass should be thoroughly dry; otherwise the casing is sure to bulge when subjected to the heat of the mold. It is always advisable to remove the tread in the usual manner and, after buffing, to dry the tire thoroughly in a vacuum drying oven or in the heated mold itself. Three periods of thirty minutes each are sufficient to dry thoroughly any ordinary casing. Unless dried a tire when built up and placed in a mold will expand and separate the plies of fabrics or cord. When the plies are separated the tire becomes weak. Expansion is caused by gas or steam and makes it difficult to remove the tire from the mold.

Many successful men reline their tires; not with the ordinary inner liner, made of inferior material and lacking shape to set in the tire, but with a first-class shaped liner, preferably one taken from an adjusted or rim cut tire. This liner can be made by any repair man or may be purchased from a supply house handling vulcanizer supplies.

There are complaints of improper fitting and stitching down of liners which do not conform to the curve of the tire, thus causing friction, heat and endless tube pinches and other troubles. Experience proves that a liner, properly inserted, stitched and vulcanized (not cemented), with the addition of the pressure obtained from the new types of vulcanizers and retreaders, fortifies the tire; the liner becomes a part of the tire itself, preventing blowouts and like accidents.

Care must be taken with steaming and the preparation of the carcass. It pays to remove the tread and old breaker of a tire. Often the outside ply of fabric is water-soaked, which causes the fabric to deteriorate and become hard and glazed, making it difficult for the cement to adhere or soak into it. This ply of fabric may be removed profitably when a three-ply liner is inserted because two extra plies are then added.

The reinforcing of tires should be done from the inside, for it is a waste of expensive fabric to apply it on the outside. The necessary repairs to a casing should be made before adding the new tread. The repairs should be at least semi-cured, as the cure of retreading and repairs in one operation has not proved successful. Complaints are heard of low spots on tires; these are usually caused by insufficient sand in the sand bags, by the pock-

eting or trapping of air, by improper tightening of clamps and other causes.

Retreading materials should be especially compounded and ordinary repair stocks should not be used. It is always well to have the proper tools. A heavy tread roller is a good investment and also a time-saver. A porcupine roller saves labor by rolling out the air blisters. A few dollars spent on necessary and labor-saving tools enable a man to turn out a first-class job. Neatness, too, is a requisite. It is just as easy to turn out a neat job as a slovenly one. Why not have a place for every tool and wrench and have the clamps, bars and bags arranged neatly on a shelf or rack?

In a small shop visited in Canada the work was perfect in every detail. The foreman said he seldom had two "touch ups" in a week. The secret of his good work lay in the foundation of his molds. These were polished after every cure with very fine sandpaper or steel wool. A few hours devoted to the surface of the molds, to cleaning them and keeping them clean, will prove profitable. For this purpose, though solutions of various kinds are used, plain Castile soap of the highest quality obtainable is excellent. A light film of this, diluted in water, should be painted on the molds; this will keep the rubber from sticking to the molds, will do away with air pockets and will maintain an even flow of rubber.

SPLICING BALATA BELTING.

BALATA AND RUBBER differ radically in their nature and properties, which necessitates very different methods of treatment in their manufacture. Balata belt making, previously described in detail in THE INDIA RUBBER WORLD, May 1, 1919, does not include vulcanization as in the case of rubber and this makes the process of splicing balata belting a specifically different process. The preparation of the ends requires the use of a square, a knife, and a warming iron for softening the balata, to permit separation of the plies, a special scraper for use on the balata surface, and balata cement, a solution of balata in a volatile solvent.

The preparation of the belting for a splice, in either rubber or balata, involves removal of the duck plies of each end to be

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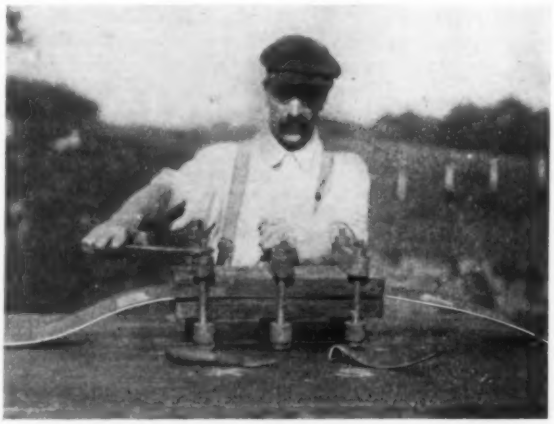
THE PLIES OF EACH END OF THE BELT BEING REMOVED IN SPACED STEPS, IT IS READY FOR SPLICING.

joined in a series of steps spaced so that each end will replace the removed portions of the opposite sides of the joint.

The prepared surfaces having been warmed by radiation from the red-hot iron heater held a short distance over them, are brush coated with the balata solution. The surfaces are dried perfectly by about 30 minutes' exposure. The laps are heated until they are very tacky, when they are carefully matched and clamped together in a suitable bench belt press, which has been well wetted to prevent the belt from sticking to it. The splice remains under moderate pressure for about ten minutes. After



(R. & J. Dick, Limited.)

THE CEMENTED ENDS OF THE BELT ARE JOINED AND SUBJECTED TO MODERATE PRESSURE ON A BELT PRESS.

removal from the press the joint is cooled in water and strengthened by sewing or riveting, or by diamond stitching with rawhide.

PILOT BALLOONS.

ONE REMARKABLE new development brought on by the war has been the scientific observation of the upper air, the measurement of horizontal and vertical distance, the marking of air currents in which the departments of the Government have shared—the War Department, the Navy and the Meteorological Section of the Department of Agriculture. Very soon they found it possible to work in harmony with each other and also with the air services of Great Britain, France and Italy.

Hundreds of young men were trained in the Signal Corps and other branches to take the necessary observations and many accompanied the forces abroad. The Ordnance Department needed the information because the knowledge of air conditions was essential in the handling of guns; that knowledge was vital to the men who went up in airplanes and dirigibles, whether fighting at the front or carrying mails and despatches; it was needed by the Navy for vessels and airships.

Among the instruments found useful were the little pilot balloons made of rubber. They were used to determine altitude conditions, air currents at different elevations and the velocity of the winds, and, when the armistice was signed, were about to be sent over enemy lands to distribute literature that might disconcert the foe.

The balloons used had to admit of high inflation and to have as little weight as possible. They were made of rubber, so cured as to retain its elasticity for a while and to allow the hydrogen to diffuse only slowly through its walls. Pure rubber balloons of a spherical shape were used, either uncolored for use against a clear sky or dark red for cloudy weather. The smaller size inflated to a diameter of 80 centimeters, weighing 20 or 30 grams, the larger, of 120-centimeter diameter, weighed 50 to 60 grams. It was very difficult to manufacture satisfactory balloons larger than 9 inches in diameter when uninflated.

The balloon ascends at a remarkably constant rate, about 10 feet a second. It is kept in sight up to distances as far as 60

miles away horizontally and nearly 20 miles perpendicularly. The rapid diffusion of hydrogen through the rubber had made flights of over a hundred miles impossible. Through an ingenious improvement, the addition of a bellyband which kept the girth of the balloon constant at a diameter of 4 feet through the discharge, while shrinking, of a few drops of kerosene, the balloon rises to higher levels until its ballast of kerosene or alcohol is exhausted.

In the first week of October, 1918, 60 such balloons, adjusted to fly between 15,000 and 25,000 feet altitude, were let loose from Fort Omaha, Nebraska; 34 of these were picked up and returned to Washington. One came down within 10 miles of New York, 1,100 miles from the starting point; another in Virginia, 930 miles away. The rest were scattered over Ohio, Kentucky, Illinois, Wisconsin and Iowa. Not one went west from Omaha.

By the fall of 1918 there were 26 upper air stations distributed over the United States; daily charts are constructed showing the

BEGINNING OF A PILOT BALLOON RUN.

wind direction and speed 500 meters above the ground with other charts for 1,000, 1,500, 2,000, 3,000 and 4, meters. It is now possible to map out the upper airways across the Atlantic as the steamers are sending up long-range balloons that drop down in Western Europe.

While great improvements were made and are being made in the instruments for accurate scientific observation it was found necessary also to devise simpler means for quick observation in the field and for rapid calculation. The Signal and the Meteorological services have developed a whole mathematical science from the formulas derived from observing the motion and variations of the pilot balloons.

NEW INCORPORATIONS.

Akron Tire Co., Inc., October 8 (Delaware), authorized capital 100,000 shares without nominal or par value. B. Ruskay, 19 West 69th street; F. E. Wysong, 202 Riverside Drive—both of New York City; D. W. Steele, Jr., Brighton Beach, Brooklyn—both in New York. Delaware agent, United States Corp. Co., 311 South State street, Dover, Delaware. Home office, Honeywell and Milliken avenues, Long Island City, N. Y. To build, rebuild, and construct tires, tubes, and all other kinds of automobile accessories.

Automatic Tire Machine Corp., November 12 (New York), $1,500,000. H. G. E. Smith, Buffalo; S. H. Millener, Tonawanda—both in New York; W. A. Schaffer, Detroit, Michigan. To manufacture machines for weaving and rubberizing fabrics.

Cell Tube Tire Co., The, November 17 (Delaware), $300,000. B. M. Barrett; M. Butler; M. M. Lucey—all of Wilmington, Delaware. Delaware agent, Colonial Charter Co., 927 Market street, Wilmington, Delaware. To deal and trade in rubber.

Consolidated Tire & Rubber Mfg. Co., Inc., October 6 (Massachusetts), $100,000. J. A. Page, 1234 Great Plain avenue, Needham; J. J. Morrill, 9 Lincoln street, Dorchester; W. C. McCallum, 15 Netherlands Road, Brookline—all in Massachusetts. Principal office, Boston, Massachusetts. To manufacture, repair, rebuild, and deal in automobile tires, rubber shoes, soles, heels, rubber and rubberoid.

Dunbar Tire & Rubber Co., September 25 (West Virginia), $1,000,000. R. W. Crissey; C. R. Wesley; E. B. Petty—all of Kent, Ohio; D. O. Blagg; W. T. Moore—both of Charleston, West Virginia. Principal office, Charleston, West Virginia. To manufacture rubber goods.

Eclat Rubber Co., The, August 26 (Ohio), $50,000. W. H. Stillwell, president; J. A. Seabold, vice-president; E. F. Ast, secretary, treasurer and purchasing agent. Principal office, 31 East Wetmore street, Cuyahoga Falls, Ohio. To manufacture mechanical rubber booth and automobile inner tubes.

Eureka Rubber Cement Co., Inc., October 23 (New York), $50,000. L. M., and I. M. Halpern, both of 2868 Heath avenue, Bronx, New York; W. F. Law, Maplewood, New Jersey. To deal in rubber and rubber cement.

Fay & Youngs Rubber Corp., November 18 (New Jersey), $350,000. M. L. Youngs; C. L. Fay, both of Mt. Vernon, New York; F. H. Miller; A. M. Youngs, both of Trenton, New Jersey. Principal office, 36 Prince street, Trenton, New Jersey. Agent in charge, F. H. Miller. To manufacture, buy, sell, import, export, trade and deal in druggists' rubber goods, etc.

General Tire Co., Inc., The, November 21 (New York), $10,000. E. J. Hogerty; T. A. McCole; J. F. Fearn—all of 170 Broadway, New York City. To manufacture rubber products.

Gordon Pen Co., October 21 (New Jersey), $50,000. R. J. Heitzman, 217 Fourth street; W. Gordon, 646 Lewis street, both of Union Hill; J. Abegg, 101 Palisade avenue, West Hoboken—both in New Jersey. Principal office, 450 Palisade avenue, West New York, New Jersey. Agent in charge, R. J. Heitzman. To manufacture, buy, sell, import, and generally deal in stylographic and fountain pens.

Keystone Tire & Rubber Co., Inc., November 21 (New York), $5,000. J. Jacobs, S. Bernheim, W. Loewenthal—all of 1877 Broadway, New York City. To manufacture tires.

Knox Tire & Rubber Co., The, June 27 (Ohio), $2,000,000. B. E. Frantz, president; E. S. Cannell, vice-president; F. D. Spencer, secretary and treasurer. Principal office, Mt. Vernon, Ohio. To manufacture tires and tubes.

Kokomobile Tire & Supply Co., Inc., November 7 (New York), $25,000. C. W. Barrell; G. B. Wilkins; R. V. Henery—all of Buffalo, New York. To manufacture rubber goods.

McEwen Tire Ventilator Co., Inc., November 20 (New York), $100,000. J. H. Rosen, Mt. Vernon; S. S. Rosen, Monterey Hotel, New York City, both in New York; T. E. McEwen, Caldwell, New Jersey. To manufacture automobile tires.

Mandler Tire Co., Inc. October 24 (New York), $5,000. H and M. Mandler, both of 117 West 115th street; S. Silverman, St. Nicholas avenue and 118th street—both in New York City. To manufacture tires.

Needham Tire & Rubber Co. of New York, Inc., October 24 (New York), $100,000. H. A. Rambonnet, Brookline, Massachusetts; G. J. Constable, Plainfield, New Jersey; E. C. Klesper, 967 St. Johns Place, Brooklyn, New York. Office address, 1695 Broadway, New York City. To manufacture tires.

New Method Tire Corp., November 17 (New Jersey), $50,000. B. De Mattia, 10 Maple Place; P. De Mattia, 40 Union avenue, both of Clinton; O. Basten, 37 East Pierrepont avenue, Rutherford; L. F. Orbe, 60 Summer street; J. A. Crowley, 113 Sherman street; J. H. McGuire, 293 Harrison street, the last three of Passaic—all in New Jersey. Principal office, 1 Wellington street, Clifton, Passaic County, New Jersey. Agent in charge. P. De Mattia. To manufacture rubber tires.

Paramount Rubber Consolidated, Inc., November 12 (Delaware), $2,000,000. T. L. Croteau; P. B. Drew; E. H. Knox—all of Wilmington, Delaware. Delaware agent, Corporation Trust Co. of America, Du Pont Building. Wilmington, Delaware. To manufacture and deal in rubber goods

Robert-Irwin Mfg. Co., Inc., November 17 (New York), $30,000. Irwin and Aaron Berkowitz; M. Rappaport—all of 179 Wooster street, New York City. Principal office, 179 Wooster street, New York City. To manufacture auto tire pumps.

Smith Rubber & Tire Co., Inc., The, September 27 (New Jersey), $1,000,000. F. W. and J. H., Jr., Smith, both of Rutherford; T. A. Hopkins, Passaic—all in New Jersey. Principal office, Lawyers Building, Passaic, New Jersey. Agent in charge, F. W. Smith. To manufacture, buy, sell and deal in all kinds of rubber goods.

Solid Inner Tube Co., November 15 (Delaware), $50,000. T. L. Croteau; P. B. Drew; H. E. Knox—all of Wilmington, Delaware. Delaware agent, Corporation Trust Co. of America, Du Pont Building, Wilmington, Delaware. To manufacture and deal in tires and tubes.

Stanton-Haskell Tire Corp., November 7 (New York), $20,000. N. D. Haskell, Buffalo; H. A. Haskell, Yougstown; H. E. Stanton, Rochester—all in New York. Principal office, Youngstown, New York. To manufacture tires.

Thompson-Goodyear Rubber Corp., October 21 (New Jersey), $60,000. L. B. Thompson, 202 Market street, Newark; R. T. Wright, 103 Midland avenue, Montclair—both in New Jersey; A. S. Wright, 52 William street, New York City. Principal office, 202 Market street, Newark, New Jersey. Agent in charge, J. A. Stryker. To manufacture, buy, sell, and deal in rubber goods of all kinds.

Tire Improvement Corp., November 26 (New York), $33,750. L. C. Kendall, 473 West 147th street; C. T. Hoskins, 26 Post avenue; C. M. Roberts, 390 Wadsworth avenue—all of New York City. To manufacture tires.

United Tire Stores, Inc., October 18 (New York), $5,000. S. Jarvis, 325 West 93rd street; G. A. McLaughlin, 680 West End avenue; M. J. Moon, 2 Rector street—all of New York City. Principal office, Brooklyn, New York. To deal in tires.

University Rubber Co., Inc., October 9 (Delaware), $600,000. W. Mackay; C. E. Barker; J. H. Jones—all of 9 East 40th street, New York City. Delaware agent, Delaware Corporation Co., 10th and Market streets, Wilmington, Delaware. To real in automobiles and rubber goods of all kinds.

Valor Tire & Rubber Co., Inc., November 1 (New York), $4,000. J. Jacobs; S. Bernheim; W. Loewenthal—all of 1877 Broadway, New York City. To manufacture tires.

THE EDITOR'S BOOK TABLE.

"DETERMINATION OF PERMEABILITY OF BALLOON FABRICS." By Junius David Edwards, Associate Chemist, Bureau of Standards, Government Printing Office, Washington, D. C.

THIS is pamphlet No. 113 of the Technologic Papers of the Bureau of Standards. The paper discusses the theory of the permeability of balloon fabrics, methods of determination, standard test, operating directions and calculations. The bulletin is sold by the Superintendent of Public Documents, Washington, D. C.

"THE INDUSTRIAL REPUBLIC." BY PAUL W. LITCHFIELD. The Goodyear Tire & Rubber Co., Akron, Ohio. (Paper, 16 mo, 73 pages.)

With thinking persons everywhere giving serious attention to the complex industrial and economic conditions existing throughout the world, and with governments attempting to effect a working agreement between capital and labor, the appearance of this little book is most opportune. It is written by a man who has spent his life employing labor, and who as vice-president and factory manager of one of the largest American rubber plants has had opportunity to know the industrial situation from every angle.

Mr. Litchfield discusses frankly and freely the labor and economic problems now confronting the United States and suggests possible solutions. He traces the history of labor and industry and concludes that autocratic capitalism must come to an end, just as autocratic political government is being cast off. Harmony and justice to all, he believes, will be assured only through participation of labor in the management and ownership of large industrial plants. The step recently taken by the Goodyear Tire & Rubber Co. in creating a council of industrial relations is a start in the direction that all big companies will ultimately see their way to follow.

Wages, he asserts, should be determined by the results of labor rather than by the time consumed, since capital cannot sell time but only the products of labor.

As capital has taken all the risks of business it has been customary for it to claim all the rewards except what was necessary to pay for labor, materials and other charges. As a result of this system two classes have grown up, one interested only in profits and the other only in wages. This condition can be overcome only by bringing about a community of interest.

He declares that if labor has received the current wage and capital the current rate of interest, then the profits which have been produced are the result of both labor and capital and should be divided between the two.

In working this out Mr. Litchfield would give labor representation in the management of the business, but until labor is in a position to bear its share of the financial risks, capital must be in control of the management. He advocates that employes be given the fullest opportunity to invest in the securities of the company for which they work and as stockholders to share in the distribution of profits as they are earned.

Mr. Litchfield takes a daring stand regarding the respective rights and duties of men and management, and the part to be played by labor in the future development of American history. He clears up numerous points not generally understood and presents many new and advanced ideas bearing on this vital issue of the hour. Many big employers of labor may not altogether agree with him, but his conclusions are bound to receive widespread attention because of his long experience and high position in the industrial world.

EXTRAIT DU BULLETIN DE LA SOCIETE INDUSTRIELLE DE Rouen, No. 4, July-August, 1918. André du Bosc. Published by J. Girieud, 58 Rue des Carmes, Rouen, France. (Paper, 12 pages.)

This reprint from the "Rouen Industrial Society Bulletin" consists of notes and papers by André Dubose on the "Destructive Distillation of Vulcanized Rubber"; "Devulcanization of Rubber by Accelerators," and "Devulcanization of Rubber by the Formation of Hexamethylene Tetramine in Rubber."

"DIRECT DETERMINATION OF INDIA RUBBER BY THE NITROsite Method." Technologic Papers of the Bureau of Standards, No. 145. By John B. Tuttle and Louis Yurow. Issued October 22, 1919, by the Government Printing Office, Washington, D. C.

This is the official publication of a paper read at Boston, September 12, 1919, at the meeting of the Rubber Section of the American Chemical Society, and abstracted in THE INDIA RUBBER WORLD, October 1, 1919, page 17.

NEW TRADE PUBLICATIONS.

BLACK & DECKER MANUFACTURING CO., BALTIMORE, MARYLAND, is sending out a beautiful illustrated price list and catalog of its electric air-compressors and Lectroflators for inflating tires, and portable electric drills and valve grinders for use in tire factories, garages and repair establishments. The cuts of these various machines and tools show the details of construction most efficiently. The book is handsomely printed in two colors and tastefully bound, and the accompanying descriptions are full and lucid.

"UNDER COVER" IS THE TITLE OF AN ATTRACTIVE LITTLE 24-PAGE magazine published by the H. H. Robertson Co., Pittsburgh, Pennsylvania, manufacturer of hydro-carbons and mineral rubber. While the publication is intended primarily for distribution among the employes of the company at its three manufacturing plants and its sixteen offices and agencies, it contains some bright snappy reading of general interest, and information regarding the company and its products. It is copiously illustrated with exceptionally good pictures.

A VERY HANDSOME AND DIGNIFIED PORTFOLIO OF PLACARDS APPEALing to the public to trust to the recommendations of dealers in tires is issued by The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio, with the general title "Building Good Will for You." While the sheets bear the name of the Marathon company they form part of a general advertising campaign designed to benefit all tire dealers.

This company also began recently to publish "Angles," an eight-page pamphlet, as its official organ. This issues monthly for the benefit of tire dealers.

THE BELDEN MANUFACTURING CO., CHICAGO, ILLINOIS, HAS published a neat 20-page pamphlet describing its business, the manufacture to order of articles molded from plastic materials such as Condensite, Bakelite, etc., giving much information to customers and prospective patrons. A large number of products are pictured and described.

"WEATHER AND HOW IT IS MANUFACTURED" IS THE TITLE OF a handsome 60-page brochure published by the Carrier Engineering Corp., New York City, explaining by halftone and text the necessities for dry or humid air in many manufacturing industries, and its various humidity and temperature-regulating devices, by which it claims ability to suit the exacting requirements for best results in factories. The book abounds in excellent illustrations of establishments where the concern's apparatus is installed. Among these are shown the drying room and the dehumidifying apparatus at the New York Belting & Packing Co., at Passaic, New Jersey. The book is substantially bound in board covers, with an attractive etching above the title.

AT LEAST ONE PRODUCER IN MALAYA CAN STAND FURTHER declines in the price of rubber, for the manager of the Kuala Selangor company reported that the output of 625,000 pounds had cost 7½ pence a pound to produce.

JUDICIAL DECISIONS.

DOUBLE FABRIC TIRE CO. *vs.* GENERAL TIRE & RUBBER CO.—In equity, District Court, Northern District of Ohio, Eastern Division, August 12, 1919.

Patent No. 964,446, for a blow-out patch for use in reinforcing or repairing automobile tire casings, was declared invalid on the grounds of want of invention and of prior public use. Four persons in repair shops in Ohio, Pennsylvania and New York testified that they had used similar patches and the identical process before the patent was granted. Bill was dismissed. (See THE INDIA RUBBER WORLD, September 1, 1919. (Federal Reporter, Volume 258, page 932.)

FEATHEREDGE RUBBER CO. *vs.* MILLER RUBBER CO. ET AL.—Circuit Court of Appeals, Sixth Circuit, June 30, 1919.

Patent No. 1,045,234, issued to Willis and Felix for a process for making artificial sponges, which had passed duly to the Featheredge company, was declared invalid because the disclosure of the process in the patent is not sufficient to enable one skilled in the art to manufacture sponges with commercial success.

It was shown that the president of The B. F. Goodrich Co. had brought back from Russia the identical process, and after making many sponges had stopped the manufacture because it was unsatisfactory. No rubber sponges were made successfully without paragol, a later invention which the plaintiff used but did not declare in the patent, and which the defendant also used. Judgment of lower court affirmed. (See THE INDIA RUBBER WORLD, November 1, 1918.) (Federal Reporter, Volume 259, page 563.)

TREASURY DECISIONS.

No. 43444.—Protest 930346 of F. W. Myers & Co. (Detroit).

RUBBER BUFFING SCRAP.—Waste scrap rubber buffing, classified as waste not specially provided for at 10 per cent ad valorem under paragraph 384, tariff act of 1913, is claimed free of duty under paragraph 513 as scrap rubber fit only for manufacture.

Opinion by G. A. Adamson: While the statute does not specifically mention the word "buffing," the merchandise was held to come squarely within the provisions of paragraph 513. United States v. Michelin Tire Co. (1 Court Customs Appeals, 518, T. D. 31544) noted. (Treasury Decisions, Volume 37, No. 19, page 37.)

No. 43456.—Protest 931900 of American Chicle Co. (Buffalo).

CHICLE.—Dissected chicle classified at 20 cents per pound is claimed dutiable at 15 cents per pound under paragraph 36, tariff act of 1913.

Opinion by G. A. McClelland: The assessment of duty appearing to be in harmony with G. A. 7984 (T. D. 36788) and abstract 41818, affirmed in Sheldon v. United States (8 Court of Customs, Appeals, 9; T. D. 37123) and American Chicle Co. v. United States (9 Court Customs Appeals; T. D. 37841, the protest was overruled. (Treasury Decisions, Volume 37, No. 20, page 15.)

DECISIONS OF THE FEDERAL TRADE COMMISSION.

FEDERAL TRADE COMMISSION *vs.* WILLIAM T. BATCHELER.

GEORGE BATCHELLER AND AKRON TIRE CO., INC. (Long Island City, New York).

The respondents were cited to appear in March last with E. P. Jones and others before the Federal Trade Commission on the charge of repairing automobile tires and selling them as new with false representations as to their being able to run 4,500 miles. The commission on September 25, 1919, found that the respondents used unfair methods of competition, in the identical words of its decision against the other respondents, delivered last April, reported in THE INDIA RUBBER WORLD for May 1, 1919, and enjoined them from making false statements, from offering for sale reconstructed tires without distinct indication that they are rebuilt and from advertising that the tires can give service for 4,000 miles. (Federal Trade Commission, Docket 253, September 25, 1918.)

THE OBITUARY RECORD.

HEAD OF THIRTY-TWO RUBBER STORES.

WILBUR S. ALLING, head of the Alling Rubber Co., which has retail stores in many cities of Connecticut, Massachusetts, and neighboring states, died suddenly November 15, 1919, at a hotel in Willimantic, Connecticut, to which place he had gone with his son in order to purchase a business block that should contain the thirty-third retail rubber store of their company.

WILBUR S. ALLING.

Mr. Alling was born in Oxford, Connecticut, March 18, 1859, of Puritan stock, the son of Edwin J. and Laura (Bigelow) Alling. He descended in the direct line from Roger Alling of Kempster, England, who settled in New Haven in 1638, was treasurer of the colony for thirty years and deacon of the Centre Church. His residence was on the land now between Church and Chapel streets, and on it stands to-day one of the Alling stores. Mr. Alling's father was a merchant and farmer and is still alive; he volunteered at the first call in New Haven, fought through the four years of the Civil war and was severely wounded at Atlanta.

Mr. Alling was educated in the country school at Oxford, and when seventeen clerked in a country store at New Hartford. By 1887 he had established a rubber store in partnership with his brother, Noyes E. Alling, a business which has developed into a chain of 32 retail stores in six states. At the same time he started the Morgan Silver Plate Co., of Winsted, of which he was president until his death. He was married in 1881 to Mary Edna Tiffany, by whom he had five children, three of whom survice: Mrs. Edna Alling Smith, Ward Tiffany Alling, and Sidney Bigelow Alling. The family moved to Norwich in 1890, and Mrs. Alling died in 1901. Mr. Alling married again, in 1906, Minnie Smith, who survives him. He also leaves four brothers, all of whom were associated with him in business.

Mr. Alling was one of the largest holders of real estate in Norwich; he was a member of the Chamber of Commerce in that city and of the Dime Savings Bank corporation, and was an active worker in the Congregational Church and in the Y. M. C. A. He was a representative in the Connecticut State Legislature for two terms.

FORMER RUBBER FACTORY ENGINEER.

Charles H. Cary, who was formerly chief engineer at the factory of the National India Rubber Co., Bristol, Connecticut, but was retired a quarter of a century ago, died October 19, 1919, at the Rhode Island Hospital, Providence, where he had been undergoing treatment for a week. He was 73 years old and was born in East Hampton, Maine.

THE DELAYED PUBLICATION OF THIS ISSUE MAKES POSSIBLE THE notice of the death of George E. B. Putnam that occurred early in December. He was well known in the shoe, leather and rubber industries as a writer and journalist. A complete obituary will be published in the January number.

INDEX TO "RUBBER MACHINERY" WILL BE SENT FREE UPON REQUEST.

Activities of The Rubber Association of America.

DIVISION MEETINGS.

RUBBER RECLAIMERS' DIVISION.—The Rubber Reclaimers' Division held its first meeting in several months on November 6 at the Yale Club and a number of matters of general interest were given attention, the most important being the revision of the standards of scrap rubber specifications and packing, which are to be reissued as soon as they can be printed.

MECHANICAL RUBBER GOODS MANUFACTURERS' DIVISION.—On November 18 the Executive Committee of the Mechanical Rubber Goods Manufacturers' Division held its regular monthly meeting, which was well attended, and a number of subjects of considerable interest to the division were given attention. As no definite conclusions were reached with respect to the more important of the subjects, no announcement of the results can be made at this time.

SOLID AND PNEUMATIC TIRE MANUFACTURERS' DIVISION.—The Joint Executive Tire Committee, which meets regularly every month, held its November meeting on the 19th and disposed of a large docket which included subjects of considerable importance to the industry, the conclusions of which are to be submitted to all members of the tire divisions for ratification before being made effective. The indications are that if the work of the Executive Committee continues to increase it will soon be necessary for the committee to give more than one day a month to division matters.

THE TRAFFIC DEPARTMENT.—The Traffic Committee held its regular monthly meeting on November 20 and the usual interesting meeting was had and a large docket was handled. Among the subjects of principal interest were the proposal to secure more favorable rates in the West to cover mixed carload shipments of rubber goods, and the policy to be pursued by the carriers after their relinquishment by the Government in connection with the handling of claims.

DIVISION ANNUAL MEETINGS.—It has been the practice for all divisions to hold their annual division meetings coincident with the annual meeting of The Rubber Association of America, Inc., which is scheduled for January 5 at the Waldorf-Astoria, New York City. Division meetings have usually been held on the morning of the day of the annual meeting or the afternoon of the day before, but as January 5 is a Monday, some deviation from the usual practice is necessary and division meetings may have to be held later in the week. A program embodying the schedule for all meetings of divisions or special committees is to be issued as soon as possible.

NEW MEMBERS.

At recent meetings of the Executive Committee of the association the following named new members have been elected, the first three to firm membership and the last to associate membership:

Washington Tire & Rubber Co., Spokane, Washington.
A. C. Spencer-Hess, New York City.
W. J. McDavid & Co., Inc., New York City.
Arthur B. Newhall, Hood Rubber Co., Watertown, Massachusetts.

FORMATION OF INDUSTRIAL RELATIONS COMMITTEE.

The Board of Directors of the Rubber Association has authorized the formation of an industrial relations committee for the association which is to serve as a medium for the discussion and exchange of ideas respecting industrial relations. The term "industrial relations" is used in the broad sense as having reference to all of the conditions attached to the relation of employer and employe, including employment, sanitation, recreation, shop rules, etc.

During the period after the beginning of the European war very unusual and radical changes were effected in the relation of employer and employes, due to the unusual demand for production which emphasized the world's necessity for many articles, thus creating a great demand for labor. The abnormal manufacturing conditions referred to in the foregoing gave labor a most unusual opportunity to ask that consideration be given to working conditions, wages, and at least a suggestive voice in determining working conditions. This situation has developed so far that undoubtedly both employer and employes have an entirely different viewpoint and the fundamentals on which employment relations shall be reconstructed must be sound and very different from anything before attempted.

It is not contemplated that the Industrial Relations Committee will undertake work of a paternalistic nature, but rather educational and cooperative activities, and it has been suggested that a general committee be formed from the representatives of firm members who are engaged in the handling of industrial problems for their companies, to consist of not more than twenty-five members who are to be chosen with due regard to the geographical relationship of the various centers of the rubber industry. From this general committee, an executive committee of ten members is to be selected to carry the burden of performing the greater part of the work connected with the activities of an industrial relations organization. The organization of these committees is being effected and it is expected that they will soon begin to function.

ANNUAL MEETING.

A call has been issued for the annual meeting of The Rubber Association at 2:30 p. m., Monday, January 5, at the Waldorf-Astoria, New York City.

THE BANQUET.

The twentieth annual dinner will be held in the grand ball room of the Waldorf-Astoria, New York City, at 7 p. m., January 5, 1920. Tickets will be eight dollars.

Arrangements have been made for seating guests at round tables accommodating parties of ten persons. Members desiring entire tables, or those who wish to sit together but do not require an entire table, will kindly state their wishes when ordering tickets. Tickets are sold only to members or to those in their employ. There is no limitation to the number which each member may purchase.

The Banquet Committee has been particularly fortunate in having secured, as speakers, Charles M. Schwab, of the Bethlehem Steel Corporation, and Lieutenant-General Robert L. Bullard, Commander of the Eastern Department, United States Army, and an interesting evening is thereby assured. The name of a third speaker will be announced later.

NOMINATIONS FOR DIRECTORS.

The Nominating Committee, consisting of Messrs. Bertram G. Work, George B. Hodgman, Harvey S. Firestone, Frederic C. Hood and Henry C. Pearson, have suggested for nomination for directors at the annual meeting of the Association for a period of three years from January, 1920, the names of the following gentlemen:

W. O. Rutherford, vice-president, The B. F. Goodrich Co.
Homer E. Sawyer, vice-president, United States Rubber Co.
A. H. Brown, Meyer & Brown, Inc.
J. S. Broughton, president, United & Globe Rubber Co.
J. A. Maguire, vice-president, The Portage Rubber Co.

SUGGESTED AMENDMENTS TO CONSTITUTION AND BY-LAWS OF THE RUBBER ASSOCIATION.

The Rubber Association has disseminated to all firm members certain suggested amendments to the Constitution and By-Laws, which may be briefly stated as follows:

FIRST: The providing of more definite and specific conditions under which firms, corporations or individuals, not directly engaged in the rubber industry may participate in the activities of The Rubber Association of America, Inc. The suggested amendments include certain limitation of voting power and different annual membership dues. They also provide that those firms, corporations or individuals not directly engaged in the rubber industry, which are now members of the Association, shall automatically upon the adoption of the suggested amendments became affiliated members.

SECOND: Specific provision to the effect that membership in The Rubber Association is not tranferable from one firm, corporation or individual to another under any conditions.

THIRD: Provision to make membership in the Association effective as for the calendar year instead of, as for a year from the first of the month following date of election.

WORK OF NATIONAL INDUSTRIAL CONFERENCE BOARD.

The Board of Directors of The Rubber Association has directed the attention of members to the work of the National Industrial Conference Board, particularly in connection with the vital industrial problems of the day, including the participation by the Board in the Industrial Conference, held recently in Washington.

The Association is distributing to its membership three of the recent important and interesting publications of the Board, entitled "Works Councils in the United States," "Statement of Principles Which Should Govern the Employment Relation in Industry," and the "Vital Issues in the Industrial Conference at Washington."

The first, "Works Councils in the United States," is a report embodying the results of a comprehensive study of works councils in 225 American industrial establishments, with considerable detail as to the various types of works councils and important facts as to their organization, constitution and methods of procedure.

The "Statement of Principles" is that which was submitted by the Employer Group to the Industrial Conference at Washington, D. C., October 10, 1919.

The "Vital Issues in the Industrial Conference" is an accurate and concise report respecting the principal subject of discussion in the Industrial Conference and is based on the official record of the proceedings of the Conference.

The Rubber Association, as a member of the Board, is contributing a substantial sum in quarterly payments, and it is understood that individual members of this Association are also making substantial contributions to the Board. Further, it is believed that a more intimate knowledge of the work, which may be gained by a careful study of the publications referred to, will bring a full realization of the necessity of continuing this important work and will, perhaps, result in the conclusion by individual companies that it is almost a duty to insure its permanence by assuming at least a small portion of the financial work.

STANDARDIZING CHECKS, VOUCHERS AND INVOICES.

THE STANDARDIZATION COMMITTEE of the National Association of Purchasing Agents in concluding its year's research on the standardization of invoices and related documents decided to submit tentative standards for invoices in order to draw constructive criticisms from those who may have occasion to use invoices. As soon as these criticisms are received it will be more readily possible to arrive at definite conclusions as to purchase orders and other documents which relate to invoices.

STANDARDIZED CHECKS AND VOUCHERS.

The Committee considered and approved the idea of standardizing checks and vouchers, which has already gained considerable impetus, having previously had the approval of the Federal Reserve Board, the standard check being 3½ by 8½ inches, the standard voucher being just double that size, or 7 by 8½ inches.

TENTATIVE INVOICE STANDARD.

In view of the fact that thousands of business houses file copies of invoices with the copies of vouchers, it was decided to make 8½ by 7 inches the first tentative standard size for invoices, permitting the printing to be run either way of the sheet. In order to accommodate longer invoices two other sizes were provided for, also those who wish to file these invoices with copies of the vouchers may do so by folding the sheet backwards; that is, with the printing out. This permits the filing of invoices in standard filing cabinets already on the market.

A few years ago when the Standardization Committee adopted a tentative catalog size a great deal of constructive criticism resulted, and a year later a National Conference was held, at which the final size was settled upon; namely: 7½ by 10⅝ inches or its half size, 5¼ by 7½, saddle stitched, so that it may be opened up flat for filing. It is hoped that similar constructive criticism may result now and that during the year it may be possible either to adopt these three sizes permanently or to select some other size as their substitute.

The committee desires to receive criticisms particularly from those who find these three sizes are not suitable for their requirements.

TENTATIVE STANDARD FORM ADOPTED.

The Committee also adopted in a tentative way a form for the invoice which will permit the vendor to record information which he should supply and provide certain standard spaces for the approval of various officials in the offices of the purchaser, and leaves three blank spaces, one on top for the name and address of vendor, on which may be written the name of the purchaser.

The body of the invoice is left blank for description of merchandise, prices, etc. The blank space on the bottom is left for rubber stamps of the purchasing departments to cover such notations as are not embraced in the printed form.

To guard against the possible duplication of payment of invoices, it was decided that the orignal and the original only was to be on white paper, all copies of invoices to be on colored paper. It was also decided to recommend tentatively the use of either 16 or 13-pound paper.

LOCATING THE INDEX IN CATALOGS.

The question of locating the index in catalogs was also taken up. The following quotation from the report of the Standardization Committee explains the attitude of the organization:

> Much confusion now exists in connection with the placing of the index in bound catalogs. Some place it in the front of the book, others in the back, while still others place it in the center. There are arguments in favor of each place, but in view of the custom which has been so long common, whereby a much larger percentage of catalog manufacturers place the index in the back of the book, the committee feels that this should be made a standard practice.

FILING OF CATALOGS.

The following extract from the report of the Standardization Committee may interest those who are responsible for the filing of catalogs:

> Committee recommends that catalogs be filed numerically according to size, catalogs to be indexed on individual cards for each vendor, vendors' cards to be filed alphabetically. Where vendors issue several catalogs on different lines of goods, index card to furnish clue to the goods contained in each catalog.
>
> Committee also recommends that catalogs of book type be filed on shelves. Pamphlets or booklets may be filed either on shelves or in vertical file drawers.

If filed on shelves, gummed stickers should be applied to the back edges, projecting about ¼-inch and numbered on the projections, the tabs to be staggered so that the numbers on each may be readily seen. If filed in drawers, drawers of legal, letter, bill, or document size may be used.

The Standardization Committee for the past year was composed of W. L. Chandler, Dodge Sales & Engineering Co., Mishawaka, Indiana, chairman; W. V. C. Bulkeley, Liberty Steel Products Co., New York City, New York; H. H. Meehan, A. B. Dick Co., Chicago, Illinois; A. Lockwood, Lumen Bearing Co., Buffalo, New York; F. L. Kulow, Willard Storage Battery Co., Cleveland, Ohio.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

(759.) A reader desires the address of the manufacturer of Underwood retreading molds.

(760.) An inquiry has been received as to what concerns manufacture a tarred paper bag 10 by 15 inches, for holding inner tubes.

(761.) A manufacturer requests the addresses of makers of squawker ends and valves for toy balloons.

(762.) An inquiry has been received for the addresses of manufacturers of pool and billiard cushions of rubber.

(763.) A manufacturer requests the address of the manufacturer of Dodd's cross expansion sometimes known as "Skookum" packing.

(764.) A subscriber desires the addresses of manufacturers of rubberized fabrics in large quantities for tires, sheeting, belting, boots and shoes, mechanical goods, rubber pillows, etc.

(765.) Inquiry is made for the address of the manufacturer of pneumatic telephone receiver cushions.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Request for each address should be on a separate sheet, and state number.

DISTRICT OFFICES.

New York: 734 Customhouse.
Boston: 1801 Customhouse.
Chicago: 504 Federal Building.
St. Louis: 402 Third National Bank Building.
New Orleans: 1020 Hibernia Bank Building.
San Francisco: 307 Customhouse.
Seattle: 848 Henry Building.

COOPERATIVE OFFICES.

Cleveland: Chamber of Commerce.
Cincinnati: Chamber of Commerce.
General Freight Agent, Southern Railway, 96 Ingalls Building.
Los Angeles: Chamber of Commerce.
Philadelphia: Chamber of Commerce.
Portland, Oregon: Chamber of Commerce.
Dayton, Ohio: Dayton Chamber of Commerce.

(31,143.) A commercial agent in France desires agency for the sale of bicycles, automobiles, tires, etc. Correspondence in French.

(31,165.) A man in Belgium wishes to purchase and to have consigned to him rubber goods and articles in celluloid. Correspondence may be in English. Reference.

(31,169.) A merchant in Belgium desires the agency for the sale of manufactured rubber articles. Correspondence and catalogs in French.

(31,186.) A man in France desires an agency for the sale of shoes, hosiery and rubberized fabrics. Correspondence in French.

(31,191.) Commercial agent in Belgium wishes agency for articles connected with heating installation, including joints in asbestos and rubber. Quotations should be c. i. f. Brussels or Antwerp. Correspondence may be in Spanish.

(31,194.) Agencies desired by a firm in France for the sale of textiles and rubber goods. Correspondence in French.

(31,200.) A Rumanian firm, established in England, wishes to buy outright, for sale in England, rubber boots and shoes; for sale in Rumania, boots and shoes of all kinds on consignment against guaranties. Quotations should be c. i. f. English port and Braila, Rumania. Payment in 30 days, English currency, through bank. Correspondence may be in English.

(31,207.) A company in Greece wishes to secure agency for insulated electric cables and wire. Correspondence in French.

(31,231.) Representative of a firm in France desires to secure agency for the sale of rubber goods.

(31,246.) Director of an agency firm in Spain wishes agencies for the sale of crude rubber, rubber goods and tires. Correspondence in Spanish or French.

(31,267.) Importer in England desires agencies for the sale of American manufacturers' goods. Has handled tires. Quotations c. i. f. European ports.

(31,269.) A firm in Spain seeks agencies for the sale of rubber goods, sanitary and medical material, rubber and glass goods for orthopedists, combs, fountain pens. Correspondence in Spanish.

(31,298.) A man in Brazil wants an agency for the sale of rubber tires and all kinds of mechanical rubber goods.

(31,316.) A firm in Canada wishes the sole agency for rubber boots, coats, trousers, hats and all supplies for fishing fleet. Cash on first order.

(31,345.) A manufacturer in Spain wishes to secure an agency for the sale of insulated and enameled copper wire on bobbins and resistance wires. Correspondence in Spanish.

(31,354.) Representative in United States of an importer in Italy wishes exclusive agency for the sale of rubber goods.

(31,399.) A company in Spain wishes to secure an agency for the sale of crude rubber, chemicals, insulators. Correspondence in Spanish or French.

THE HOUSE OF BIRKENSTEIN TO SELL CRUDE RUBBER.

S. Birkenstein & Sons, Inc., of Chicago, New York, Philadelphia and Minneapolis, one of the oldest and most important rubber firms dealing in scrap rubber in the United States, now over a half century in existence, is entering upon the business of handling plantation rubber as well. The head of the company, Louis Birkenstein, who for five years was president of the Waste Material Dealers' Association, has been serving for over a year at the head of the Salvage Department of the Quartermaster-General's office.

A NEW SOURCE OF ASBESTOS.

A great deposit of asbestos in the district of Gaspé, near Port Daniel at the mouth of Chaleurs Bay, which lies between New Brunswick and Quebec, is about to be developed by a Montreal company. The deposit is of low-grade asbestos, the best being of No. 2 crude quality, but there are 2,000,000 tons in sight, the outcroppings of a mountainside, easy to work. Within a short distance are the necessary water-power and raw materials needed to work the asbestos into cement, brick, and other products. A mill with a daily output of 63 tons is being installed.

RUBRAX.

Rubrax is a high melting point asphaltum product intended for mixing with all grades of crude and reclaimed rubbers as a filler, preservative and substitute.

News of the American Rubber Industry.

FINANCIAL NOTES.

THE MASON TIRE & RUBBER CO., Kent, Ohio, has increased its capital stock to $7,500,000, having begun with an initial allotment of only $250,000 four years ago.

The net profits of The B. F. Goodrich Co., Akron, Ohio, for the six months ended June 30, 1919, before deducting Federal taxes, were $7,700,000; at the rate they have been going since, it is probable that they will exceed $8,700,000 for the last six months, making a total for the year of $16,400,000, the greatest in the history of the company. After deducting preferred dividends, the balance available for the $60,000,000 common stock would be $24 a share. The company has increased its capital from $27,000,000 at the end of December, 1915, to $43,500,000 at the end of 1918, and may increase the common dividend rate. In four years the Goodrich company has actually added to its common stock a value of $70 a share.

It seems likely that the sales of The Goodyear Tire & Rubber Co., Akron, Ohio, for 1920 will exceed $200,000,000. The sales for the fiscal year ended October 31, 1919, made a total of $167,315,000, those for October alone being the highest in the company's history, $20,000,000. The year's sales in 1915-16 were less than $64,000,000; in 1910-11 they were only a little over $13,000,000, and in 1907-08 they were just over $2,000,000. The company's business has increased a hundred-fold in twelve years. The stockholders of the Goodyear company have approved the increase of $100,000,000 in capitalization, bringing the total authorized capital to $200,000,000.

The directors of Lee Rubber & Tire Corp., Conshohocken, Pennsylvania, have decided to increase the capital from 100,000 shares to 150,000 shares. Of the 50,000 new shares, 40,000 are offered first to stockholders at $33 a share; the other 10,000 will be offered to employes on a profit-sharing plan. The sale of the additional shares will give the company $1,200,000 with which to expand its business and it is expected that the output by next spring will be 4,000 tires a day.

The statement of the corporation for the eight months ended August 31, 1919, shows net profits of $396,375, before deducting Federal taxes. Net sales amounted to $3,345,067; the cost of goods sold to $2,956,541, and the operating profit was $1,388,526.

The Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, has filed with the Massachusetts Secretary of State a statement of its financial condition, dated August 31, 1919, which we compare with that for 1918.

ASSETS.

	1919.	1918.
Real estate	$1,502,090	$1,558,981
Machinery and equipment	943,493	981,414
Merchandise, material, stock in proc.	2,675,255	3,038,106
Cash and debts receivable	1,809,190	2,022,891
Patent rights, trade-marks, etc.	1	1
Investments	410,376	.....
Total	7,340,409	7,607,394

LIABILITIES.

Capital stock	3,850,000	3,789,700
Accounts payable	1,460,025	333,498
Floating debt	.....	1,552,000
Surplus	2,030,383	1,932,196
Total	7,340,409	7,607,394

The Hodgman Rubber Co., Tuckahoe, New York, has increased its capital stock by the authorization of $1,000,000 eight per cent preferred stock, $100 par value, and 50,000 shares of common stock of no par value. Of the new preferred stock $197,500 is to provide for the retirement of an equal amount of the old preferred, and the balance has been sold. Of the common stock there are 12,100 shares now outstanding.

EXPLAINING STOCK OF NO PAR VALUE.

It is a common practice of corporations to show at the head of the liability side of their balance sheets the full par value of their capital stock issues outstanding. The stockholder has no means of telling how much of this amount represents paid-in value. For this reason it is becoming a common practice at the present time to issue stocks of no par value. While for balance sheet purposes a value must be placed on the shares, the public is not misled by this to the same extent as it would be by the old practice of putting in the par value.

A few investors seem to be mystified by the new practice, however, and for the benefit of these it may be stated that the value of a share of stock with no par value, may be readily estimated by dividing the profit and loss surplus by the number of shares outstanding, adding to the surplus, of course, any value which may be set against capital stock. ("The Magazine of Wall Street.")

DIVIDENDS.

The Ajax Rubber Co., Inc., New York City, has declared its quarterly dividend of one and one-half per cent, payable December 15 on stock of record November 29, 1919.

The Archer Tire & Rubber Co., Minneapolis, Minnesota, at a meeting of its directors held October 25, 1919, resolved to put its stock on a six per cent cash dividend basis beginning January 15, 1920.

The Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, has declared its regular semi-annual dividend of three per cent on its preferred stock and its regular quarterly dividend of $3 per share on its common stock, both payable December 15, 1919.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, has declared its regular quarterly dividend of one and three-quarters per cent, payable December 15 on its second preferred stock of record December 1, 1919.

The General Electric Co., Schenectady, New York, has declared a cash dividend of $2 per share, and a stock dividend of two per cent, both payable January 15, 1920, on stock of record December 6, 1919.

The B. F. Goodrich Co., Akron, Ohio, has declared its regular quarterly dividend of $1.75 per share, payable January 1, 1920, on preferred stock of record December 21, 1919.

The Kelly-Springfield Tire Co., New York City, has declared its quarterly dividend of $1.50 per share, payable January 2, 1920, on six per cent preferred stock of record December 15, 1919.

The New Jersey Zinc Co., New York City, has declared an extra dividend of two per cent, payable December 10 on stock of record November 29, 1919.

The board of directors of the Overland Tire Co., Newark, New Jersey, recently voted to pay dividends quarterly hereafter instead of monthly. Action on the next dividend will be taken late in December.

The Pennsylvania Rubber Co., Jeannette, Pennsylvania, has declared its regular quarterly dividends of one and three-quarters per cent on preferred stock and one and one-half per cent on common stock, payable December 30 on stock of record December 15, 1919.

The Plymouth Rubber Co., Canton, Massachusetts, has declared its regular quarterly dividend of one and three-quarters per cent, payable December 1 on preferred stock.

THE ROBERTSON PROCESS METAL IS A PREPARATION THAT DOES not rust and that resists the action of gases and weather conditions. It is a steel sheet protected first by a coating of asphalt on which asbestos is laid and over that a heavy waterproofing covering. It is turned out in various shapes and is used for roofing and siding.

NEW JERSEY ZINC CO.'S RUBBER CHEMIST.

HARLAN A. DEPEW, who has recently associated himself with the research division of the New Jersey Zinc Co., at Palmerton, Pennsylvania, is peculiarly well fitted to fill the position. Having graduated from the Chemical Engineering Department of the University of Michigan in 1913, and after teaching general chemistry for a year, and taking a year of post-graduate work, he received the degree of M. S. in physical chemistry in 1914. The next year he entered the Bureau of Mines at Pittsburgh, Pennsylvania, for research work in physical chemistry and two years later was sent to Seattle, Washington, as the chemist in the new metallurgical station then being opened there.

HARLAN A. DEPEW.

In January, 1918, he was transferred to the war gas investigation under the Bureau of Mines, at American University, Washington, D. C., becoming a second lieutenant, C. W. S., U. S. A., when the War Department took over the work, which office he filled until December 30, 1918. He then entered the employ of the Firestone Tire & Rubber Co., Akron, Ohio, as research physical chemist, working largely on problems of heat, such as heat distribution during vulcanization, and heat due to internal friction.

Entering upon his new duties with the New Jersey Zinc Co. in October, he is now engaged in experimental work on rubber compounds and studying the properties produced by the different pigments in these compounds.

PERSONAL MENTION.

J. P. Davis, purchasing agent of the Belden Manufacturing Co., Chicago, Illinois, has been elected president of the Purchasing Agents' Association, Chicago. Special importance attaches to this position at this time, since the convention of the National Association of Purchasing Agents is to be held in Chicago in 1920. Mr. Davis was formerly assistant purchasing agent for the Standard Underground Cable Co., Pittsburgh, Pennsylvania, and has been with the Belden company since 1916.

William F. Hart, who recently resigned as sales manager of the Rubber Insulated Metals Corp., Plainfield, New Jersey, has been appointed sales manager of the Needham Tire & Rubber Co. of New York, Inc., 1695 Broadway, New York City.

Harold O. Smith, formerly president of the J. & D. Tire Co., Charlotte, North Carolina, has become associated with the Ajax Rubber Co., Inc., 218 West 57th street, New York City, in charge of the company's activities pertaining to housing and general welfare work.

The estate of the late Frank Cazenove Jones, whose obituary was published in THE INDIA RUBBER WORLD, October 1, 1918, has been appraised as follows: Total estate, $117,445; cash, $14,477; personal, $3,724; stocks and bonds, $99,244. His widow, Anna M. Jones, receives $51,220; his son, Frank C. Jones, $17,468, and his two daughters, Pauline C. Chittenden and Florence C. Doughten, $16,554 each.

L. M. Bergin, managing director of the Dunlop Rubber Co., Limited, of Great Britain; Sir Harry McGowan, one of the influential directors; Captain George du Cros, manager of the works at Birmingham, and other leading men in the company, are now visiting the United States with the object of establishing a Dunlop company in America, with a $50,000,000 capital, as the chairman of the British company, A. L. Ormrod, announced at the extraordinary meeting held on December 1, 1919.

H. Cassel has been appointed manager of the New York City branch of The Portage Rubber Co., Akron and Barberton, Ohio, succeeding George H. Kiley, resigned.

Averill Tilden has been elected to succeed H. L. McClaren as a director of the Ajax Rubber Co., Inc., 220 West 57th street, New York City.

WESTINGHOUSE ALLIANCE FOR WORLD WIDE TRADE.

On his return from Europe late in October, General Guy E. Tripp, chairman of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, announced the completion of arrangements by which a business alliance has been formed between that company and the Metropolitan-Vickers Electric Co., Limited, the purpose of which is to expand the business of the two companies throughout the world. One feature of this arrangement was the payment by the British company of between $5,000,000 and $7,000,000 to the Westinghouse company.

The Westinghouse Electric and Manufacturing Co. has taken over the plant of the New England Westinghouse Co. at Springfield, Massachusetts, and will soon have about 5,000 men at work there, manufacturing industrial motors and lighting outfits, supplementing the work at the East Pittsburgh, Pennsylvania, plant. The company has sold the drop-forging plant at Chicopee Falls, Massachusetts, which it operated as the Page-Storms Drop Forge Co., it not being adapted to the post-war needs of the company. The J. Stevens Arms Co., another Westinghouse enterprise, where rifles were made for the Russian Government, is now turning out sporting rifles, and enjoying the heaviest business in its history.

ROBERT ALLAN RETURNS TO BRAZIL.

Robert Allan, who was for many years manager of the London & Brazilian Bank at Pará, Brazil, and a well-known and popular figure in financial and rubber circles of that city, has accepted a position with the Mercantile Bank of the Americas, and sailed for Brazil last month.

Mr. Allan enlisted in the 2nd Battalion Scots Guards in December, 1917, and was severely wounded in the engagement in front of Arras. After six months in the hospital he was discharged five days after the armistice was signed.

PLANNED A SOUTH AMERICAN RAILROAD.

Señor Enrique Coronel Zegarra, for more than twenty years connected with the project of building with American capital the Paita-Maranon railroad, to connect the Amazon river with the Pacific, died recently at Lima, Peru. The proposed railroad was planned as a link in a system of transcontinental transportation, crossing the Andes from Paita on the Pacific to the upper waters of the Maranon river, which is navigable from the base of the Andes to the Amazon of which it is one of the great tributaries. President Leguia of Peru declared in his inaugural address on October 12 that the negotiations for the construction of the railway were well advanced and that it would open up a region capable of supporting a population of twenty-five million people. Señor Zegarra was formerly a member of the Peruvian Cabinet.

THE NUMBER OF AUTOMOBILE TIRES IMPORTED INTO JAVA AND Madura during the month of August, 1919, was 18,277 as compared with 14,317 during the month of August, 1918.

From January to August, 1918 and 1919, the imports of this commodity into Java and Madura amounted to 70,708 and 149,569, respectively.

THE NEW YORK AUTOMOBILE SHOWS.

An exhibition of the very latest advance in automobiles, their parts and accessories, both for pleasure and for commercial purposes, will appeal to the wide-awake public as few things can. There will be really two exhibitions at the same time in New York City, that of automobiles at the Grand Central Palace, and that of motor trucks at the Eighth Coast Artillery armory. They will be held on the same days, from Janaury 3 to January 10 inclusive, enabling the general public and the technical experts to visit both during their stay in the city, and to see with their own eyes the countless improvements and inventions which have been stimulated by the needs arising out of the war.

M. & A. M. A. APPOINTS FIELD SECRETARY.

The Motor & Accessory Manufacturers' Association, having found it advisable to appoint a field secretary, announces that Alexander W. Barber has been selected for that important position. By training and experience he is well equipped for this work, having been connected with the credit department of the Irving National Bank, New York City, and previous to that was a member of the inspection department of the New York Life Insurance Co.

In his new position he will travel about the country, keeping in touch with the credit managers' and other executives of the various companies of the Association, which now numbers more than 360 members.

THE RUBBER TRADE ASSOCIATION OF NEW YORK ELECTS OFFICERS AND DIRECTORS.

The following officers and directors of The Rubber Trade Association of New York were elected at the annual meeting, held November 6, 1919.

OFFICERS—1919-20.

William T. Baird, president; F. R. Henderson, vice-president; H. W. French, treasurer; A. W. Stedman, secretary.

DIRECTORS.

William T. Baird, Rubber Trading Co.; W. E. Bruyn, L. Littlejohn & Co., Inc.; H. W. Holcombe, Rubber Importers & Dealers' Co., Inc.; H. W. French, Gove & French, Inc.; F. R. Henderson, F. R. Henderson & Co.; Samuel Kubie, Raw Products Co.; Edward Maurer, Edward Maurer Co., Inc.; Frank Poel, Poel & Kelly; A. W. Stedman, Arthur W. Stedman, Inc.; William H. Stiles, William H. Stiles & Co.; C. T. Wilson, C. T. Wilson Co., Inc.

MINNEAPOLIS TRUCK TERMINAL A SUCCESS.

The "ship by truck" movement in Minneapolis appears to have become a permanent institution. After little more than one month's operation the Minneapolis Truck Terminal has had to double its floor space to take care of increasing business. Located in the heart of the wholesale district, this terminal is affording a central depot to ten motor express companies whose routes extend in all directions within a radius of 100 miles. It is the point from which incoming loads are distributed throughout the city, and at which outgoing loads are assembled.

Trucks are carrying into the city great quantities of farm produce, much of which would otherwise go to waste, and are taking back to the farmer furniture, machinery, groceries and other necessities of life. Wholesalers and merchants are lending hearty support. They deliver goods for the outlying districts at the terminal, where it is sorted and distributed to the rural express operators. It means only a city delivery for the wholesaler, while express operators find that the small charge made by the terminal company represents a large saving to them over what it would cost to run their heavy trucks over the city streets in making pick ups.

The terminal company is at present making a flat rate of five cents per hundred weight for its service, which includes obtaining new business for truck line operators, making collections and taking care of bookkeeping. Drivers are instructed to take orders from rural merchants for anything needed from wholesalers. These orders are turned in to the terminal company, and by it sent to the wholesale houses. The prevailing rates for shipments by truck are little more than the rates by freight for corresponding classifications. Taking into consideration the fact that by truck several handlings of each shipment are eliminated, that boxing or crating is not necessary, and that from two to seven days' time is saved in delivery, it is no wonder that shippers are enthusiastically supporting the "ship by truck" movement. Certainty of delivery and elimination of damage to goods in transit are other considerations that are rapidly gaining friends for the motor truck in the short haul field.

Tire and truck manufacturers, merchants, farmers and express companies have been following this venture with great interest, and its complete success forecasts the early establishment of other similar services elsewhere with profit to all concerned. Certainly extensive express trucking means greatly increased tire consumption.

HEWITT BASEBALL TEAM WINS BUFFALO CHAMPIONSHIP.

The Hewitt Rubber Co., Buffalo, New York, boasts of the prowess of its baseball team which won the championship of the Washington League of the Buffalo Municipal Baseball Association, in October, winning 16 out of the last 18 games in which it played. This victory was celebrated by a banquet given by President and Mrs. Hewitt at the Iroquois Hotel.

THE HEWITT BASEBALL CHAMPIONS.

This victory gave the club the privilege of playing off the champions of the rival league. Two games were required, both of which were won by the Hewitts, thus making them the champions of Buffalo, and this victory was duly celebrated, closing with the presentation of a handsome watch to the manager of the club, Arthur L. Schwartz.

The club disbanded for the season, proud of its record and of the trophy and individual prizes presented at a special vaudeville entertainment given November 5. Meanwhile the bowling team and basket-ball teams of the Hewitt company are progressing well for the championship of their respective sports.

THE B. F. GOODRICH CO.'S TIRE ADJUSTMENT POLICY NOT ONLY insures the user of Goodrich pneumatic tires against imperfect tires but clearly specifies a definite number of miles he may expect as a minimum under proper usage, namely, 6,000 miles on fabric and 8,000 miles on cord tires.

THE RUBBER TRADE IN OHIO.

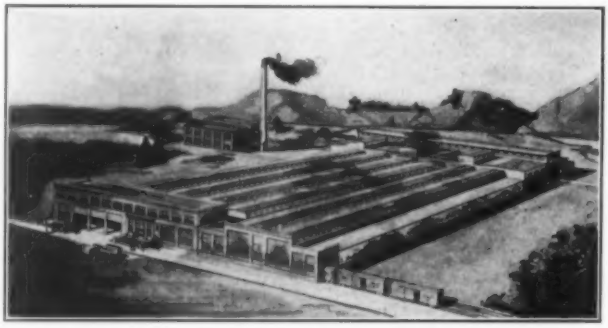
By Our Regular Correspondent.

FIRESTONE'S LATEST ADDITION.

GROUND was broken about October 1 for a new mechanical building for the Firestone Tire & Rubber Co., Akron, which, as shown by the illustration, will be a thoroughly modern, up-to-date structure, 325 feet long by 315 feet wide, and costing $400,000.

The front section is three stories high and 25 feet deep, to contain offices, locker rooms, wash rooms, shower baths, lunch room, and cafeteria. Just behind, two bays, each forty-five feet deep, with headroom under the trusses of thirty feet, are equipped with two ten-ton traveling electric cranes. The remainder of the buildings will consist of eight bays, each twenty-five feet wide, with a height of fifteen feet under the trusses. At the southwest corner is planned a forge shop 50 by 100 feet, and along the south side of the main building a storage and loading platform eighty feet long will be built.

The roof is of sawtooth construction with a northern exposure that does away with shadows. Ample ventilation, both natural and artificial, is supplied, since part of the heating system can be used to give plenty of cool air, and can be operated in the summer as a ventilating system to keep the air in constant circulation. The floor will be of wooden blocks laid on reinforced concrete, a combination which, besides being best adapted to the requirements of a building intended for mechanical purposes, is also easiest on the feet.



MECHANICAL GOODS PLANT OF THE FIRESTONE TIRE & RUBBER CO.

The equipment is to be in keeping with the modernness of the building. The machinery will be actuated by individual electric motors. This addition will be occupied by the electrical, machine, pipe, carpenter and tin shops, and almost 500 hands will be employed there. It is intended to be completed, equipped, and occupied early in the new year.

NEW FIRESTONE RIM PLANT.

Ground was broken in October at Akron for an additional $1,000,000 plant in the group of Firestone factories. The new plant will house the Firestone Steel Products Co., which annually produces approximately 1,500,000 demountable rims for pneumatic automobile tires and 65 per cent of the steel bases used in the United States for solid truck tires.

The Firestone Steel Products Co., at present occupies the group of buildings which until 1910 housed the entire manufacturing facilities of the Firestone company. This group which was then too small to meet the demands for Firestone tires, is now too small to meet the demands for Firestone rims.

Firestone rims were first manufactured in Cleveland, they were of the demountable type and were soon adopted by many motor car manufacturers.

By 1910 large sizes of solid tires were coming into use and there was need of steel bases for them. As the demand promised to grow steadily, Mr. Firestone installed a welding plant as a department of the Firestone Tire & Rubber Co., where they were fashioned. Shortly afterward he decided that the company should turn out its own rims for pneumatic tires and enlarged the welding plant for the purpose.

In 1916 the demand for rims passed the 1,000,000 mark, and by May, 1918, the business had grown to such proportions that Mr. Firestone decided to form a separate company to produce rims and steel bases. The Firestone Steel Products Co. was the outcome.

The main building of the new plant will be 860 by 250 feet. Advantage will be taken of every opportunity to give the workers light and ventilation. The machinery throughout will be of the most improved type. Immediately in front of the main building will be a two-story office building, 170 by 40 feet. It will be connected with the main building by covered bridges. A cafeteria for the entire factory force will be housed in the basement of the same building.

NEW PLANT OF THE FIRESTONE STEEL PRODUCTS CO., AKRON, OHIO.

AKRON NOTES.

The Mohawk Rubber Co., Akron, will place on the market a line of special pneumatic truck tires as soon as its additions to plant buildings and equipment are completed. Some sizes are already being manufactured.

On November 16, The B. F. Goodrich Co., Akron, through its recreational department began the presentation of a program of motion pictures in the recreation hall for Goodrich employes and their families.

The Goodyear Tire & Rubber Co. has instituted a new system, whereby it will assist its employes in starting and carrying bank and savings accounts, by attending to the details of depositing each week, in any bank, trust or loan company designated by its workers, such proportion of the weekly pay as each one may wish to lay aside, and placing in the pay envelope a receipt showing that the deposit has been made. The banks open a regular account, for each depositor, with a pass book in which each payment is credited.

This system is one which must commend itself to many thrifty and frugal workers who by this method are relieved of the necessity of going each week to make their deposits, and by which they are committed to a systematic savings plan, or to feel assured of regular payments of assessments in their building and loan associations. The system is one which might well be adopted by other large industrial establishments.

Among the organizations of The Goodyear Tire & Rubber Co.'s employes at Akron, Ohio, the "silent" base ball team, made up entirely of deaf mutes is noteworthy and is now well known throughout northeastern Ohio. Last season the team had a record of twelve victories out of sixteen games, a percentage

of 75, which shows that talk is not essential to baseball, as all the teams they met and defeated were other than mutes, and some of them were strong teams. The team has a large following among the other deaf mutes, silent fans who encourage them by rooting from the bleachers in the sign language. With the end of the baseball season the "silent" team has turned itself into a football team.

GOODYEAR'S SILENT BASEBALL TEAM

The Goodyear Tire & Rubber Co., Akron, has started a class in law in the factory school, under capable tutors.

The Goodyear Tire & Rubber Co., Akron, will build a $200,000 dormitory for girls in its employ to accommodate 175. It will be of brick, three stories high, situated in the Goodyear Heights community. The management will be in the social service department, under Miss Clara E. Bingham, and the project will be operated on a cost basis.

L. C. Rockhill, recently appointed sales manager of The Goodyear Tire & Rubber Co., has been connected with the company for over 12 years, previous to which time he was in the advertising department of a Cleveland newspaper. His first service with Goodyear was in charge of the repair department, and he was successively made manager of the aeronautical department, manager of the automobile tire department and assistant sales manager in charge of tire sales. His promotion to his new position is a deserved recognition of his ability and his long experience in selling.

L. C. ROCKHILL.

D. E. Day has been appointed manager of footwear sales for the Firestone Tire & Rubber Co., Akron. Previous to coming to the Firestone company last February, as credit man of the footwear department, he was for eight years credit man for the Mishawaka Woolen Manufacturing Co., Mishawaka, Indiana.

The B. & W. Rubber Co. is now installing machinery in its factory at Homes and Talmadge avenues, Akron, and will start manufacturing by the middle of December. The company will produce a high grade of reclaimed rubber, and will manufacture a line of mechanical goods. The officers of the company are: H. A. Backderf, president; D. M. Bauer, vice-president; George W. Payne, secretary; G. J. Carter, treasurer, and L. Bognar, purchasing agent.

MISCELLANEOUS OHIO NOTES.

The tire salesmen of the Rubber Products Co. held their annual convention at the factory at Barberton, Ohio, October 30, spending three days in discussing plans for the campaign of 1920, when the output of the factory will be doubled. One evening the company entertained the visitors, together with all the factory superintendents and foremen, at the Akron City Club, and the next evening a dinner was held at Smith's Hotel, Long Lake, one of the many lake hotel resorts near Akron. At the business and social sessions much enthusiasm was evident, and the salesmen claimed that the company would be compelled to triple its present output.

The Pearce Tire & Rubber Co., Ashtabula, Ohio, has leased its plant to The Colonial Tire & Rubber Co., Anderson, Indiana, for a period of five years, and is winding up its affairs, the Colonial company having acquired control of the plant.

The Gordon Tire & Rubber Co., Canton, Ohio, has promoted to the position of sales manager its eastern special sales representative, M. S. Lines, succeeding A. W. Senz, who recently resigned. Mr. Lines was connected for seven years with the sales department of the Michelin Tire Co, Milltown, New Jersey, previous to coming to the Gordon company.

The L. & M. Rubber Co., Carrollton, Ohio, has appointed A. W. Senz its general sales manager. Mr Senz has been with The Gordon Tire & Rubber Co., Canton, Ohio, for the last five years.

The Buckeye Rubber Products Co., National City Building, Cleveland, incorporated under Ohio laws, has acquired the plant at Willoughby, Ohio, recently used by the War Department for the development of poison gas. The main building, approximately 150 by 600 feet, will be equipped and operated for the manufacture of heavy mechanical rubber goods, under the direction of Edwin L. Stimpson, factory manager, recently superintendent of the Mechanical Rubber Co., Cleveland, assisted by Webster Norris as consulting technologist. The officers of the company are: Charles H. Roth, president and general manager; Webster Norris, vice-president and consulting technologist; James M. Mackay, treasurer and sales manager; C. V. Goepper, secretary.

The Excel Rubber Co., Wadsworth, Ohio, has increased its capital from $100,000 to $600,000. The officers of the company are: M. H. Leatherman, president; H. D. Mench, vice-president; R. M. Trump, secretary and treasurer. The directors include Charles Farr, E. J. Krabill, C. M. Wertz, F. G. Alderfer and John Manoly. The company will begin the manufacture of "Excel" tires on its own account about the first of March. It will also make a full line of accessories, such as reliners, blow-out patches, hook-on and lace-on boots, vulcanizing rubber and cement.

The National Tire & Rubber Co., East Palestine, Ohio, at its annual meeting elected the following officers: C. L. Merwin, president; S. L. Warner, vice-president and general manager; C. E. Miley, vice-president, in charge of sales; C. W. Helman, secretary, and R. B. Taggart, treasurer.

R. H. Sotherland, formerly purchasing agent of The Mansfield Tire & Rubber Co., Mansfield, Ohio, has resigned to identify himself with The Columbia Tire & RubberCo., of the same place, to take effect December 1, 1919.

With headquarters at Cincinnati, L. L. Heidacher will serve the Firestone Tire & Rubber Co., Akron, as special representative in a territory extending from Sault Ste. Marie to Louisiana. He was formerly truck tire manager at the company's branch in Memphis, Tennessee.

The Glamorgan Tire and Rubber Corp., Orrville, Ohio, has increased its capital from $250,000 to $500,000. It was incorporated in October, 1918, under the laws of Delaware, to manufacture automobile and bicycle tires, inner tubes and accessories.

The McNaull Tire & Rubber Co., Toledo, has been incorporated under the laws of the State of Delaware to succeed to the business formerly conducted by the McNaull Tire Co. of the same city, the latter having gone into bankruptcy and been placed in

the hands of Frank Miller, attorney, as receiver. The new company will manufacture a high-grade cord and fabric pneumatic tire under the McNaull patents which it has acquired. The distinguishing feature of the McNaull tire is the construction of the arch.

The present plan will be immediately enlarged to increase production, and in addition to the necessary land on which to build, options on adjoining real estate have been secured. The officers of the new company are: W. D. McNaull, president; F. R. Wilhelmy, vice-president and treasurer; C. S. Wachner, secretary; directors: W. T. C. Carpenter, F. S. Gordon, Edward H. Cady, William F. Ridge, A. R. Fraser, and the president and treasurer of the company.

Work on the new power plant of The Standard Tire Co. at Willoughby, Ohio, is progressing so well that it is expected that it will be in full operation by the first of January. Cord and fabric tires are being made.

THE NATIONAL TIRE & RUBBER CO.'S GENERAL MANAGER.

S. L. WARNER, vice-president and general manager of The National Tire & Rubber Co., East Palestine, Ohio, is a typical American who has risen to his present position by individual exertions and innate ability. Born in Kent, Ohio, November 9, 1868, his early education in the public schools was interrupted by the necessity of earning his living. Choosing to become a printer, he learned that trade while working on newspapers in Kent, Ravenna and Cincinnati, and a printing house in Akron, meanwhile attending night school to learn bookkeeping and commercial principles.

S. L. WARNER.

Leaving the printing office, he accepted a position as bookkeeper for a local firm, and then a wholesale grocery concern in Akron, advancing until he had charge of the credit and collection department of the latter company, a position he relinquished to join the Diamond Rubber Co., Akron, first as correspondent and later in charge of the credits and collections of the eastern half of the United States.

In 1911 he came to The McGraw Tire & Rubber Co., East Palestine, Ohio, as credit manager, later becoming office manager, superintendent of branches, Pacific coast manager and then assistant sales manager. When The National Tire & Rubber Co., East Palestine, Ohio, passed to the control of the same interests as those of The McGraw Tire & Rubber Co., Mr. Warren was made general manager, and later vice-president, both of which offices he now holds.

As a citizen of East Palestine, he is noted for his public spirit, being especially active in such movements as the Red Cross, War Service Union and civilian relief organizations. He is a Knight Templar, a Shriner and a 32d-degree Mason.

A. L. PARDEE MANUFACTURERS' REPRESENTATIVE.

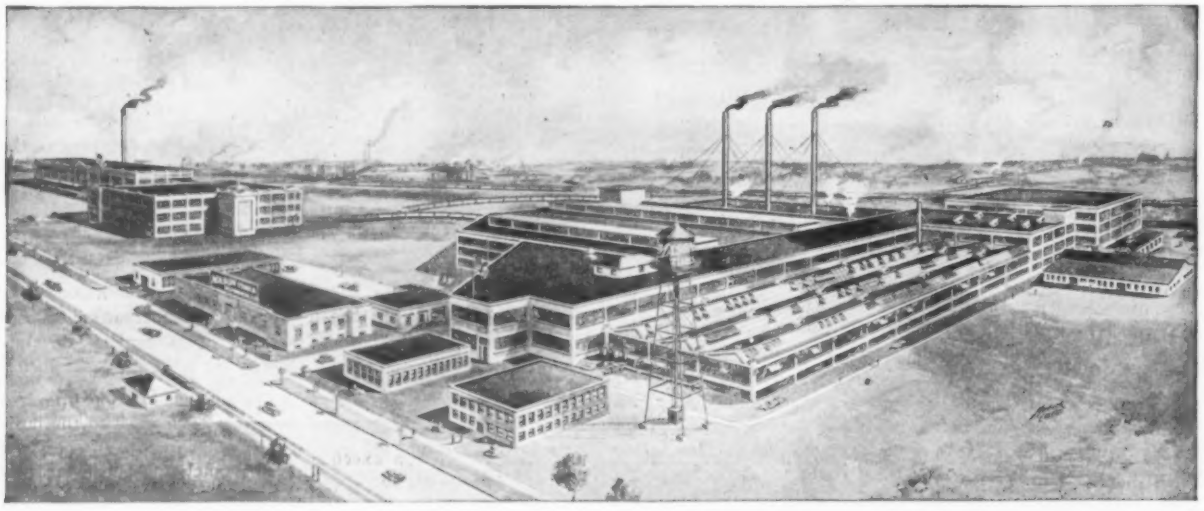
A. L. Pardee has resigned as purchasing agent of The B. F. Goodrich Co. to engage in business for himself as a manufacturers' representative, with offices at 512-513 Ohio Building, Akron, Ohio. He also expects to represent several other manufacturers of well known rubber specialty products.

A. L. PARDEE.

Mr. Pardee entered the employ of the Diamond Rubber Co. in 1894 and was rapidly advanced to the position of purchasing agent. At the time of the consolidation of the Goodrich and Diamond companies he assumed the same duties with the Goodrich company. During these years he has bought almost every commodity used in the rubber industry, not only raw materials but manufactured supplies as well. For many years, however, he has specialized on textiles as applied to the manufacture of rubber goods. Much of his time will be devoted to the interests of the Brighton Mills, of Passaic, New Jersey, tire fabric manufacturers, for whom he will be western representative.

NEW DEVELOPMENTS OF THE MASON TIRE AND RUBBER CO.

The $2,000,000 cotton fabric mill, erected by The Mason Tire & Rubber Co., at Kent, Ohio, is the first tire fabric mill ever built in the Akron district, and marks the third expansion of the company in the three years since the original factory was built. The mill is constructed of concrete and steel and has 125,000 square feet of floor space. In it are embodied the most advanced ideas, both in design and equipment, known to tire fabric manufacturers. The first unit of 10,000 spindles will be



PLANT OF THE MASON TIRE AND RUBBER CO.

in operation in a few months, and four more such units will be provided as need requires.

The extension of the rubber plant will place the Mason company among the first five tire producers of the Akron district. Eighty thousand square feet of floor space will be devoted to rubber in the new buildings, which will give a producing capacity of about 2,200 tires, solid and pneumatic, a day. Extensions of the administrative and welfare buildings, garages and so on will be made this year, and the plans prepare for future additions in all departments. The housing of the large force of workers is also provided for, as 140 acres of land have been bought for improvement and a large number of houses have been built during the year. These are well constructed and modern and are rented or sold to employes on favorable terms.

MID-WESTERN NOTES.

By Our Regular Correspondent.

THE following appointments have been made by the Firestone Tire & Rubber Co., Akron, in the Middle West and West: L. A. Brown, special truck tire sales representative in the Northwest; C. W. Brown, office manager, St. Louis, Missouri; M. O. Halverstadt, office manager, Des Moines, Iowa; A. W. Hugh, office manager, Fargo, North Dakota; George Jacoby, office manager, Great Falls, Montana; E. A. Snyder, office manager, Minot, North Dakota; H. J. Guther, special representative for truck tire sales, with headquarters at Chicago, Illinois; George W. Keller, special representative of the new cycle tire sales department, with headquarters at Chicago, territory to include, in addition to that city, Minneapolis, St. Paul and Duluth, Minnesota; Milwaukee, Wisconsin; Des Moines and Davenport, Iowa; Fargo and Minot, North Dakota; and Great Falls, Montana.

The Pan-American Rubber Co., now of Milwaukee, Wisconsin, manufacturer of the "Parco" cellular pneumatic inner tire, is building a factory on South First street, Watertown, Wisconsin, which is expected to be occupied by the first of January, on which date the company will remove its office to the new factory address. Its leading product is an inner tire filled with a substance similar to sponge rubber, and which, because of its construction, obviates the trouble of punctures and blowouts.

The Racine Rubber Co., Racine, Wisconsin, has bought 55 acres of land in the vicinity of its factory and subdivided it into lots on which it is now building houses for 200 families. These contain six rooms each and have all modern improvements. They will be sold to employes of the company on a monthly payment basis, practically the equivalent of rent. Thirty houses will be ready for occupancy about January 1, and the balance about April 1.

The Black Hawk Tire & Rubber Co. is now equipping its factory at Des Moines, Iowa, and expects to begin manufacturing fabric and cord tires and red and gray inner tubes by January 1. The officers are: William Moran, president; John F. Griffin, vice-president; Earl A. Lewis, secretary; and J. J. O'Malley, treasurer. Paul I. Anderson is superintendent, and C. E. Reiss technical engineer.

The Haywood Tire & Equipment Co., Indianapolis, Indiana, is to build a foundry on Harding street and Pennsylvania railroad, to cost $115,000. This will be of the monitor type, 100 by 200 feet, equipped with traveling overhead crane and new machinery. A machine shop will be added, also. M. E. Haywood is president.

The International India Rubber Corp., South Bend, Indiana, is receiving bids on a factory addition one story high, 110 by 117 feet. This is one of three new additions planned.

The Kokomo Rubber Co., Kokomo, Indiana, has opened six factory branches in southern and middle-western states and has appointed Earl P. Logan director of sales. Mr. Logan was formerly in charge of the central district of the Federal Rubber Co., Cudahy, Wisconsin, with headquarters in Chicago. The Kokomo company is one of the older tire companies, having been established in 1895 for the manufacture of bicycle tires, druggists' sundries, etc. Three years after its inception, it also began making automobile and carriage tires. In the same year, 1898, it doubled its initial capital, and in 1901 quadrupled it, while in 1917 it increased it from $200,000 to $1,000,000. In the meanwhile it has established branches, incorporated as individual companies, under the laws of several other states.

Charles E. Wood, Singer Building, 149 Broadway, New York City, crude rubber broker, is opening an office in the Advertising Building, Room 1420, Chicago, Illinois, in charge of Clinton Taveniere, for the last nine years with the Goodyear Rubber Co. of New York. It is Mr. Wood's intention to get closer to manufacturers and give them prompt and efficient service, and the Chicago office is being opened with this purpose in mind.

J. B. Gabeline, president and general manager of the Standard Four Tire Co., Keokuk, Iowa, has left for an extended trip through the South. His company is showing rapid progress. Three large mills and one 68-inch calender are being installed in the new addition to the company's factory.

Plans were drawn two years ago for a $600,000 addition to the Brunswick-Balke-Collender Co. tire and tube factory at Muskegon, Michigan, but the work was temporarily held up on account of war conditions. The plans are now being redrawn on a much larger scale and ground for the new structure will be broken just as soon as the drawings are completed. The battery jar department, of which H. G. Vanderhoef was recently appointed general sales manager, has outgrown its present quarters and will be allotted larger space in the new additions.

Because of expansion plans, the capitalization of the Hawkeye Tire & Rubber Co., Des Moines, Iowa, was increased on October 28 from $1,500,000 to $3,500,000, $875,000 of the increase being preferred stock and $1,125,000 common.

Work has been started on the company's new building, the cost of which will amount to approximately $350,000. The business has grown to such an extent that the demand for Hawkeye tires during the last six months has been far in excess of the factory output.

The Nebraska Tire & Rubber Co., Omaha, Nebraska, has been operating its factory night and day to take care of the volume of business which has been secured. The "Cornhusker" tire is a hand-made, extra ply, oversized tire, and has made good from the start. Plans are under way for increasing the production to take care of the growing demand.

TECHNICAL ENGINEER OF THE BLACK HAWK TIRE & RUBBER CO.

C. E. Reiss, who resigned from the chemical department of The B. F. Goodrich Co., Akron, Ohio, last September to accept the position of technical engineer of the Black Hawk Tire & Rubber Co., Des Moines, Iowa, was graduated from Ohio State University in the class of 1915, in chemical engineering. Immediately after graduation he entered the chemical laboratory of The B. F. Goodrich Co., under George Oenslager, now the company's chief chemist. At the end of the first year he began working on mechanical rubber goods under Mr. Noble of the development department and during the war worked on all gas-mask compounds in connection with factory production. Mr. Reiss' experience in these departments undoubtedly fits him excellently for his new position with the Black Hawk company.

C. E. REISS.

PRESIDENT OF THE F. E. PARTRIDGE RUBBER CO.

FREDERICK E. PARTRIDGE, president of the F. E. Partridge Rubber Co., Limited, Guelph, Ontario, Canada, was born in Bowdoinham, Maine, in 1873, and entered the rubber industry at the age of 21 as a workman in the factory of the Maynard Shoe Co., Claremont, New Hampshire, manufacturer of tennis shoes. His aptitude for the business secured for him rapid promotion to the position of foreman and then of superintendent. Five years later he became night superintendent at the Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, which position he resigned four years later, and after a short term as general superintendent of the Combination Rubber Co., Bloomfield, New Jersey, a call came to him to serve as superintendent for the Canadian Rubber Co., Montreal, Canada, of which concern he later was made manager, and still later, was elected vice-president.

F. E. PARTRIDGE.

Making a success of other people's business induced him to strike out for himself in 1915. Organizing a company under his own name, he rented a small factory at Guelph, Ontario, which has been constantly added to and enlarged until it will soon accommodate a working force of 500 people in its big, modern five-story building, the daily output of which is 475 tires, 600 inner tubes, 500 water bottles and 1,000 tobacco pouches.

Mr. Partridge is also the leading spirit in the Northern Rubber Co., Limited, Guelph, Ontario, an entirely separate concern which will soon commence the manufacture of the "Partridge" brand of rubber footwear.

CANADIAN NOTES.

THE FIRESTONE TIRE AND RUBBER CO. OF CANADA, LIMITED, has been formed in Canada, capitalized at $5,000,000, and a factory will be built at Hamilton, Ontario, where 135 acres of land have been bought. On one-half of this plot a housing plan for employes, similar to Firestone Park, Akron, Ohio, U. S. A., will be carried out, the other half being occupied by modern factory buildings constructed on the unit plan.

In addition to the products now made by the Firestone company in Akron, the Canadian organization will manufacture mechanical goods, including belting, and a boot and shoe department will probably be established. A plant for the manufacture of steel rims will also be built soon. The new company, created primarily to meet the Canadian demand for Firestone products, will also share in the company's export business, particularly that in the British Empire.

The K. & S. Canadian Tire & Rubber Co., Limited, 527 Yonge street, Toronto, Ontario, is building a modern plant.

In Kitchener and Waterloo, Ontario, as in many other industrial centers, the demand for dwelling houses exceeds the supply. The Dominion Rubber System finds that it is handicapped in obtaining the additional permanent help it needs because of the difficulty of housing them. Kitchener was unwilling to take the responsibility of building homes under the Ontario Government Housing Act, which provides for the loaning to municipalities, or to housing companies operating under municipal commissions. However, when the Dominion System offered to guarantee the city against loss, the city agreed to legalize the enterprise by appointing a municipal housing commission. The adjoining city of Waterloo asked to be put on the same basis as Kitchener, and under this agreement 200 houses will be erected in Kitchener and 100 in Waterloo, mainly for workers in the Dominion rubber plants in the larger city.

PACIFIC COAST NOTES.

By Our Regular Correspondent.

LOS ANGELES NOTES.

J. O. WARD, Los Angeles district manager of The Miller Rubber Co., reports that the growth of business in his district has made necessary the construction of a new two-story building on Hope street, the former quarters having been entirely outgrown.

Douglas Fairbanks, the well-known motion picture actor of Los Angeles, has ordered the first set of pneumatic tires to be manufactured at the new plant of the Goodyear Tire & Rubber Co. of California now under construction in that city.

The Carlisle Tire & Rubber Co., Carlisle, Pennsylvania, has appointed the Cooper & Kehler Co., Los Angeles, manager of its new branch in that city.

The Mohawk Rubber Co., Akron, Ohio, will open its new branch at 18th and Flower streets, Los Angeles, January 1, 1920.

SAN FRANCISCO NOTES.

The Braender Tire & Rubber Co., Rutherford, New Jersey, has opened a Pacific Coast branch at 133 Eighth street, San Francisco.

The Mohawk Rubber Co., Akron, Ohio, has a Pacific Coast branch at 1436 Van Ness avenue, San Francisco.

NORTHWESTERN NOTES.

A sales conference of all the Goodrich representatives of the northern Pacific Coast territory was recently held in Seattle, Washington, and over 50 salesmen were in attendance. This is one of the largest and most important territories in the Goodrich organization including the states of Washington, Oregon, Montana, Idaho, Alaska and the province of British Columbia, upwards of 282,161 automobiles being owned within its borders. W. D. Albright, northwestern manager of the Goodrich company, called the conference and presided at the meetings, during which many important matters relating to trade in the district were discussed. The rubber salesmen were given a banquet at the Butler grill together with a smoker and entertainment which concluded the conference.

The Seattle Automobile Tire Co., one of the largest individual tire retailing firms in the West, with stores in all the principal cities on the Coast, has contracted for the handling of the Ajax and Fisk tires.

C. L. Brockway has been named to manage the tire department of the United Motors Co., of Seattle, and will have charge of the distribution of Thermoid tires in the entire northwest section of the state of Washington. Mr. Brockway has been engaged in the tire business for six years, coming to Seatle from Sioux City, Iowa, last December.

THE BATAVIA RUBBER AUCTIONS, WHICH HAVE NOT BEEN HELD for some years, were resumed in October, 1919, by the Batavia Rubber Association.

THE RUBBER TRADE IN MASSACHUSETTS.

By Our Regular Correspondent.

THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY, which many consider the greatest institution of its kind in this country, and in the world, has offered its services as expert and research engineer in a consulting capacity to manufacturers, upon payment of a suitable annual fee. The Institute has on its faculty many of the leading industrial scientists in this country. Annually many scientific problems are studied and worked out, and therefore the solution of many such problems which confront manufacturing establishments are already available. In brief, the Institute offers its services in a consultant capacity, on an annual salary basis, and in return for this fee will permit the firms thus retaining such services to make use of the Institute's extensive library, files and laboratory facilities, and to consult with the members of its staff and faculty on problems pertaining immediately to the needs of the client firms or corporations.

Carried to its conclusion, this plan will make the Institute one of the greatest consulting bodies in the world. Its range will cover practically every field of technical research. Through the plan those who devised it hope to see evolve a new relationship between Tech and the industrial organization of the country. American industry, they say, has long been in need of a clearing house of scientific knowledge. The Tech plan, they declare, creates a clearing house.

Almost immediately upon the announcement of this plan many prominent firms became subscribers, among the first being the American International Corp., New York; the General Electric Co., Schenectady, New York; the Simplex Wire and Cable Co., The American Telephone and Telegraph Co. and The Goodyear Tire & Rubber Co.

In Quincy, Massachusetts, where, during the World War, more than 18,000 men were employed in the shipbuilding works, there was great difficulty in housing the workmen. The Government built dormitories as well as single houses for their accommodation. Since the armistice was signed there has been a heavy reduction in the number of men employed in this work, and many of these houses became available for other workmen. Last month there was a widespread rumor that the Hood Rubber Co., of Watertown, had bought 21 of these dormitories, and land adjacent. Coupled with this was the conjecture that the Hood company would erect an extensive manufacturing plant there and give employment to a large number of workmen. Inquiry regarding the truth of this rumor elicited a distinct denial, Mr. Hood stating that there was nothing in it.

A "get-together" dinner was held, late in October, at Phillips Inn, Andover, the development of recent plans of the Tyer Rubber Co., of that town, for the establishment of a service department. The company, fifty in number, comprised the general manager, superintendent, the heads of each department, all the foremen and one or more delegates from each department of the works, the latter being elected by the workers in these departments. To emphasize the thought that all present met as employes only, place cards were drawn by lot, so that representatives of the management were seated, not as a group, but with the other employes, and the spirit of good-fellowship enjoyed by all attested the wisdom of this plan. The service manager acted as toastmaster, and the matters introduced by him became subjects for general discussion in which both management and workmen took enthusiastic part. These included the value of cooperation between individuals and the company and between department and department; the kind of goods manufactured; the use of a suggestion box, and the desirability of a definite plan for further cooperation. As a result of the meeting the plan for the suggestion box was adopted and a sub-committee from the dinner group appointed to plan a permanent service organization, to take the form of a service association, operating through a general improvement or works committee. An informal musical program by several employes added much to the pleasure of the evening.

The Cambridge Rubber Co., Cambridgeport, has let the contract for a five-story brick addition to its factory, to cost about $50,000. Each floor will be 74 by 90 feet. The new part will be devoted to the automobile top fabric and the tennis shoe departments. When the addition is completed, the company will have a total floor area of over 100,000 square feet.

The Beacon Rubber Co., Lynn, Massachusetts, manufacturer of rubber heels and fiber and rubber soles, has purchased a two-story factory building at the corner of Commercial and Bennett streets, West Lynn. The factory has a power plant connected and a floor space of about 10,000 square feet. The lot is a large one with plenty of room for additional factory space when required. Edmund J. Twomey is president of the company and James E. Connor secretary and treasurer.

The Pyrotex Leather Co. is the name of a concern recently incorporated in the sum of $50,000 to manufacture artificial leather, which has started fitting up a factory on Whitney street, Leominster, this state. Winthrop M. Mays is president; Ralph A. Robertson, secretary, and Harold A. Burdett, treasurer.

The Boston Woven Hose & Rubber Co., Cambridge, has made arrangements whereby its employes may obtain advice on all legal questions free of charge from the Harvard Legal Aid Bureau, thus saving them the expense of employing an attorney. Hours have been arranged so that the Bureau may be consulted without interfering with working hours. This will undoubtedly be of great assistance to many of the workers, and particularly so in the case of those who become victims of loan sharks, whose practices are well known to every large employer of labor.

The company will soon start classes to teach English to foreign-born employes, this also at no expense to them. The classes will be held from 12 to 1 o'clock, so as not to interfere with working hours.

The Converse Rubber Shoe Co., Malden, has purchased a large, old-fashioned estate in the residential section of that city, and will remodel the big house, modernize and furnish it to accommodate 50 persons with board and room, the intention being to run it on the club or cooperative plan to house out-of-town women employes of the company. The work of remodeling will begin soon, and is expected to be completed at an early date in 1920, and thus materially reduce the high cost of living there, for Malden, like all cities having extensive industries, is at present short of boarding and rooming accommodations, which, of course, adds to the difficulty of manufacturers in securing sufficient and efficient help.

Will diving suits of rubber be superseded by those made of brass? Last month a trial was made of a suit of that metal, weighing 400 pounds, in which the diver went to a depth of 360 feet under the surface of the sea in Boston harbor. It is estimated that at that depth the pressure was about 150 pounds to the square inch, and it is in this greater power of resistance that the metal suit is claimed to have the advantage over the ordinary rubber diving suit. As a precaution against any possible defects, which might become apparent under the increasing pressure the diver was lowered into the water very slowly, half an hour being required for the trip to the bottom. John F. Turner, the diver, has had wide experience as a diver and some years ago reached a depth of 154 feet in an ordinary suit. He says that this invention is the most nearly perfect thing of the kind he has seen. It is the intention of the inventor and the diver to attempt the salvage of $30,000,000 in gold bullion from the British steamer *Laurentic*, which was sunk off the Irish coast during the World War.

The eighteenth annual automobile show will be held in Mechanics Building, in Boston, March 13 to 20 inclusive. Approximately 105,000 square feet of floor space will be available for exhibition purposes, and the show is expected to surpass all previous affairs of the kind in this city.

Among the speakers at the banquet of the Victorian Club, Boston, in November, was Elston E. Wadbrook of MacNamara & Wadbrook, Inc., crude rubber broker, New York City.

The Firestone Tire & Rubber Co., Akron, Ohio, has appointed George M. Powell territory salesman out of Springfield, Massachusetts.

T. E. Kane, formerly chief mechanical engineer of the Plymouth Rubber Co., Canton, Massachusetts, has become associated with the sales service of the Mansfield Machine Shops, Sydney Birch Co., Mansfield, Massachusetts.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

RHODE ISLAND CONCERNS engaged in the manufacture of rubber goods of every grade and character are busy, running practically to capacity, with encouraging indications for a continuance for an indefinite period. The scarcity of skilled employes and the increased cost of materials have been handicaps that have caused the management of all the concerns considerable anxiety and trouble. Labor unrest, involving demands for increased wages, shorter hours and an occasional incipient strike, have added to the perplexities and difficulties of the general situation. Many of the companies have been making additions to their plants, while others would do so if there were favorable prospects of securing the additional labor required to operate the new machinery.

The work of improving and extending the plant of the National India Rubber Co., at Bristol, has been rapidly pushed during the past few weeks. Substantial improvements and repairs have been made on the company's wharf and other property along the water front at the foot of Church street, and arrangements have been made for burning crude oil instead of soft coal for fuel, which, it is claimed, will save the company much labor and expense. A new reinforced concrete tank, 56 feet in diameter with a capacity of 150,000 gallons, has been constructed under the surface of the ground near the boiler house, from which the oil will be pumped out and sprayed into the boilers by steam. The same boilers that have been in use for the burning of coal will be utilized with some necessary changes in the attachments of pipes.

Already the beneficial results of the day nursery that was established last spring are evident, and the great increase in the number of children left at the nursery while their parents are at work has necessitated the erection of an addition with a sun parlor 10 by 25 feet.

Among other features of the welfare work of the National Rubber Co., the Americanization of the employes is being vigorously pushed. Miss Evelyn Carter, for several years a teacher in the public schools of Bristol, has been engaged to take charge of this educational work.

Following conferences between committees representing the employes and the manager of the National India Rubber Co., the matter of establishing a company store for the sale to employes of meats and groceries is under consideration and there are promising prospects of a cooperative store being established.

The equity suit of the I. T. S. Rubber Co., of Elyria, Ohio, against the United Lace & Braid Manufacturing Co., of Providence, alleging infringement of patent rights on a rubber heel, has been assigned for December 29 in the United States District Court for the District of Rhode Island.

The Davol Rubber Co., Providence, Rhode Island, has announced the following promotions and changes in its personnel: R. J. Fries, manager of sales in addition to being advertising manager; Walter L. Davol, assistant sales manager; J. A. Clemens, recently returned from service with the American Army of Occupation at Coblenz, production manager; Jesse Little, production superintendent; and T. B. Dowling, factory foreman.

The George Grow Tire Co., Providence, manufacturer of fabric and cord tires, has enlarged its local retail and wholesale store, and will occupy the premises at 67 to 75 Exchange street as an office and salesroom.

The K. & C. Tire & Rubber Co., which recently opened its manufacturing establishment at 13-15 Calender street, Providence, is headed by Cornelius F. Kelleher, manager, and James H. Creamer, treasurer. Both young men were recently discharged from military service. Mr. Kelleher was for eight years employed by the Sterling Tire Co., where he served as chief chemist. He was also employed in a similar capacity by the United States Rubber Co., at its Valley street plant. The company manufactures both cord and fabric tires, inner tubes, repair stocks and vulcanizing cements. A cheaper but longer life inner tube will soon be placed on the market.

Samuel P. Colt, president of the United States Rubber Co. and of the National India Rubber Co., its Bristol subsidiary, on Thanksgiving Day telegraphed Daniel Frohman, president of The Actors' Fund Home, West New Brighton, Staten Island, New York, his subscription of five thousand dollars as a "Rhode Island Thanksgiving offering to the Actors' Fund of America," for which contributions are being asked.

The Collyer Insulated Wire Co., Pawtucket, Rhode Island, is building a two-story concrete addition, 120 by 60 feet, to cost approximately $50,000.

Two three-story brick buildings on Main and Carver streets, Pawtucket, 60 by 160 feet, are to be erected by the Tubular Woven Fabric Co. It is expected that the structures will be ready for occupancy in about five months. Both will be equipped with modern machinery and will be used in the manufacture of electrical insulation covering.

The O'Bannon Corp., manufacturers of carriage cloth at West Barrington, has commenced fitting up a new restaurant on the second floor in the main building of its factory for the accommodation of the office force.

The Lynn Rubber Co.'s plant at Warren is very busy on orders for rubber heels. Since the factory was first opened less than a year ago there has been a constant increase in the number of employes and it has been found necessary already to make additions to the equipment.

THE RUBBER TRADE IN NEW JERSEY.

By Our Regular Correspondent.

TRENTON NOTES.

THE rubber manufacturers of Trenton report that the early winter finds the trade very brisk with prospects for a good season. All the tire concerns are very busy and expect to continue so through the winter. One prominent manufacturer informed a representative of THE INDIA RUBBER WORLD that the mechanical rubber business had lately improved 100 per cent.

Some of the Trenton rubber manufacturers were represented in the parade held in celebration of Armistice Day. The Joseph Stokes Rubber Co. captured the second prize of $25 for heavy truck floats. The float, which was brilliantly lighted, was entitled "Peace, Honor and Purity." A number of the girl employes of the plant wore appropriate costumes. Other rubber concerns also had floats.

The Ajax Rubber Co., Inc., Trenton, has purchased five

dwelling houses adjoining the plant on North Olden avenue and will later have them razed for the purpose of building an extension to the works.

Sixty employes of the Ajax Rubber Co. have recently taken out naturalization papers at the Mercer County Court House, making the company 100 per cent American. English classes will be opened for the men in the Ajax plant.

The two-story brick plant of the Puritan Rubber Manufacturing Co., situated at the foot of Perrine avenue, Trenton, was destroyed by fire early on the morning of November 17. The blaze started in the packing room and was of unknown origin. The Puritan Rubber Co. recently changed hands and is now owned by Boston business men. The concern manufactured mechanical rubber and molded goods and had a large stock on hand. All the office effects not in the safe were destroyed, and the machinery was wholly ruined. The company officials have not yet decided on rebuilding plans.

The Delion Tire & Rubber Co. has filed a certificate of dissolution in the office of the Secretary of State at Trenton. The plant of the company was recently taken over by the Bergougnan Rubber Corp., of which details were published in THE INDIA RUBBER WORLD, September 1, 1919.

Walter C. Price and associates, Baltimore, Maryland, have bought the business, name, good-will, trade-marks, etc., of the Delion company, which has been reorganized with the same name under the laws of Maryland, with offices at 131 West Mt. Royal avenue, Baltimore. A modern factory will be built, having a daily capacity of 400 tires, and high-grade fabric and cord tires and tubes will be made.

Fay, Miller & Youngs, manufacturers of druggists' rubber sundries, with a factory at Barberton, Ohio, has purchased the plant of the Fidelity Pottery Co., at Trenton. The property consists of three buildings of 50,000 square feet of floor space, and a good portion of land. The company is making a number of alterations, and when these are completed the machinery and equipment of the Barberton plant will be removed here and that plant closed. The officers of the company are: Charles L. Fay, president; Arthur M. Youngs, vice-president; Merle L. Youngs, secretary and treasurer, and Fred H. Miller, assistant secretary and treasurer. The company has offices at 75-77 Spring street, New York City.

MISCELLANEOUS NEW JERSEY NOTES.

The Duratex Co., 768 Frelinghuysen avenue, Newark, manufacturer of rubber goods, will expend about $300,000 for construction and about $200,000 for equipment in a series of buildings to be erected. The company has a tract of seven acres of land and will erect nine buildings. The main factory building will be 100 by 500 feet. The storage building will be 200 by 60 feet, two stories high. The laboratory will be 40 by 40 feet. There will also be an addition to the power plant.

Vice-Chancellor Backes has granted an order directing parties in interest to show cause why Elgin L. McBurney, of Jersey City, receiver for the Indian Tire & Rubber Co., of New Brunswick, should not be permitted to accept a bid of $50,000 for the company's business and assets. The concern manufactured solid rubber tires for trucks. Mr. McBurney was appointed receiver last May in a proceeding instituted by Bilder & Bilder before Vice-Chancellor Lane in behalf of Virginia A. and Rose L. Cavagnaro, of New York, stockholders and creditors of the company. Immediately after Mr. McBurney's appointment, the corporation's directorate, in violation of an order restraining the corporation from the exercise of its franchise, had counsel file a voluntary petition in bankruptcy, with the result that certain directors were adjudged in contempt. No penalty was ever imposed, however. In the schedule incorporated in the bankruptcy petition, the liabilities were put at $94,118.74, while the assets were inventoried at $121,614.87, the principal items being real estate, $39,000; machinery, $37,000, and material on hand, $20,000. The corporation was said to have $167,700 of capital stock outstanding.

The Jenkins Rubber Co., Elizabeth, New Jersey, has made arrangements to take over the brass founding section of the Crane Co.'s plant at Bridgeport, Connecticut, where formerly much of the metal parts of their valves were manufactured under contract. Business with the company is reported excellent.

George W. Johnson, for some years a salesman in the employ of the Lambertville Rubber Co., died at a Trenton hospital on November 12 after an illness of several weeks. The deceased was 39 years old and a member of the Citizens' Band of Lambertville and New Hope. He is survived by his widow. Mr. Johnson was born at Flemington, this state.

The Victory Tire & Rubber Co., Asbury Park, New Jersey, has changed its name to the Rydon Tire & Rubber Co.

The Stanwood Rubber Co., Newark, New Jersey, has acquired the majority of the stock of the Hardman Rubber Corp., New Brunswick, New Jersey, and has completed arrangements for the distribution of the Stanwood company's output in twelve different cities through branches, in addition to twenty-four other retail distributers.

The Overland Tire Co., formerly at 15-25 River street, Newark, New Jersey, has removed to Cortlandt and Holmes streets, Belleville, New Jersey.

The Okonite Co. has established its executive offices at its factory at Passaic, New Jersey.

The Braender Tire & Rubber Co., Rutherford, New Jersey, has transferred its advertising account from the Manufacturers Publicity Co., 30 Church street, New York City, to Collin Armstrong, Inc., 1463 Broadway, to which all correspondence concerning advertising should be addressed.

EASTERN NOTES.

The Pennsylvania Rubber Co., Jeannette, Pennsylvania, has made arrangements for displaying its products in five rooms on the northern end of the Garden pier, Atlantic City. C. B. Williamson will be in charge.

The Kelley Tire & Rubber Co., 962 Chapel street, New Haven, Connecticut, has purchased land and expects soon to let a contract for the erection and equipment of a plant costing about $250,000, for the manufacture of Kelley Kord and Kelley K tread tires and Kelley Blue tubes. Edward J. Kelley is president and the other officers are: Charles H. Bortelle, Jr., vice-president and treasurer, and William F. Alcorn, secretary.

The Goodyear Cotton Mills, Inc., Killingly, Connecticut, is planning another cotton mill of 30,000 spindles, 140 by 430 feet, two stories in height, to balance its weaving capacity. Yarn is now being bought in anticipation but contracts have not been let. The new unit will require about 60 additional tenements for housing employes.

E. I. du Pont de Nemours & Co. (incorporated), Wilmington, Delaware, has bought about 65 acres of land near Baltimore, Maryland, for storage purposes.

The Reliance Tire & Rubber Corp., Wilmington, Delaware, has been authorized to do business in the State of New York, capitalized at $250,000. E. Holway, 50 East 42d street, New York City, has been appointed representative.

The Oldfield Tire Co., Cleveland, Ohio, has been authorized to do business in the State of New York, with a capital of $500,000, and has appointed R. L. Mills, Bush Terminal, Brooklyn, New York, its representative.

The Rochester Tire & Rubber Co., Rochester, New York, has increased its capital from $500,000 to $750,000.

The National Wholesale Druggists' Association held its forty-fifth annual meeting at the Hotel Grunewald, New Orleans, Louisiana, November 3-7, inclusive. Among those present were the following representatives of the Davol Rubber Co., Provi-

dence, Rhode Island, manufacturer of druggists' rubber sundries; P. R. Wesley, general manager; E. J. George, Chicago office; G. A. Sheehan, San Francisco office; E. G. Hartwell, southwestern representative; and John A. Burgess, southeastern representative.

The Record Tire & Manufacturing Co., a Delaware corporation, has dissolved under the laws of the State of New York, but has been authorized to do business in that state through its representative, H. F. Hartjen, at 238 West 53d street, New York City.

The Seamless Rubber Co., Inc., New Haven, Connecticut, has its new $2,000,000 plant well under way and has sold the property on Hallock avenue, where it is building, to trustees for the Seamless Rubber Associates, Inc., who, in turn, have leased it to the Seamless Rubber Co., Inc., for twenty years at $72,000 annually. The property is now being connected with the New Haven railroad by a spur track. It fronts on the harbor.

The Amalgamated Tire Stores Corp., whose organization was noted in our issue of November 1, 1919, has leased the five-story building at 1974 Broadway, New York City, for its general offices and eastern distributing point, and will open about thirty stores in other cities.

The Kokomobile Tire & Supply Co., Buffalo, New York, has been organized to distribute to the retail trade in western New York and northern Pennsylvania the products of the Kokomo Rubber Co., Kokomo, Indiana, including bicycle tires, and the Wright & Ditson-Victor Co. sporting goods lines. C. W. Barrell, formerly with The B. F. Goodrich Rubber Co., Akron, Ohio, will manage the concern; G. B. Wilkins, of Indianapolis, will have charge of sales, and R. V. Henery, of the office and direct advertising.

The Middletown Rubber Co., Inc., 280 Broadway and 5 Columbus Circle, New York City, has secured a most desirable site for a factory on the main line of the Erie railroad, at Middletown, Orange County, New York, and plans to erect there a factory for producing cord tires. The officers of the company, which was incorporated last August with an authorized capital of $1,000,000, are: Myron J. Friedman, Chicago, Illinois, president; William Rusnak, Chicago, vice-president; S. A. Thompson, Cleveland, Ohio, secretary; and J. T. MacDonald, Cleveland, treasurer and general manager.

The New York Asbestos Co., formerly at 203 Front street, New York City, has removed to 394 Canal street, where it has leased a six-story loft building for a term of years.

The Universal Rubber Products Co., J. B. Topham, president, has completed the equipment of a modern tire manufacturing plant located at Zelienople, Pennsylvania. The output will be tubes and unguaranteed tires. Manufacturing operations will begin December 1, 1919.

The General Electric Co., Schenectady, New York, has completed the erection of an extension 100 by 100 feet, which has been added to building No. 89.

The Motor and Accessory Manufacturers' Association, Aeolian Building, New York City, has arranged for its members to participate in the show of the Minneapolis Automobile Trade Association, to be held from January 31 to February 7, 1920. In addition, shows at New York, Chicago, and Boston have been sanctioned by the M. & A. M. A., the largest number of official automobile shows ever sanctioned in any one year.

Plans of the Beacon Tire Co., Beacon, New York, for the coming year include the eight-hour day, an attractive insurance feature free to employes, a bonus system embracing all workers, athletic games and meets, etc. The new building will soon be completed and new machinery installed.

A. Schrader's Son, Inc., Brooklyn, New York, manufacturer of tire valves, gages, etc., is building a new ten-story building of concrete and steel construction, 90 by 196 feet, to be adapted for the operation of heavy machinery on every floor and to be equipped with automatic sprinklers, stand-pipe connections to street with outlets on each floor to the two stair towers, sprinkler tank on roof cross-connected with sprinkler tank on Building No. 1, Manhattan district fire alarm system, hospital for employes, lunch rooms, lockers, a library, etc.

The J. & D. Tire Co., Charlotte, North Carolina, has changed its name to the McClaren Rubber Co., from the name of its president, H. L. McClaren. The plant will be enlarged and distribution organized in the principal cities.

The Pan-Rubber Products Co., 311 Steinway avenue, Long Island City, New York, has been established as a retail store to sell well known brands of rubber goods to small consumers who cannot buy direct, and to act in an advisory capacity to firms requiring special goods. F. K. Bodenschatz is president and general manager.

The Polack Tire & Rubber Co., has transferred its general office from Broadway and 62d street, New York City, to its factory at 145 Howard avenue, Bridgeport, Connecticut.

PROSPECTIVE VALUES OF RUBBER.

The question of the valorization of india rubber is considered again in *"Le Bulletin de l'Association des Planteurs de Caoutchouc,"* of Antwerp, which regarded it as not practical in 1913. Valorization now is made to mean not merely the fixing of the standard price by the government, by buying the surplus crops or otherwise, but the regulation of prices by any combined effort such as that of trusts or associations and by any means, such as the restriction of output or exportation which the Rubber Growers' Association tried to put through with the plantation rubber of the British Far East in 1918.

The *Bulletin* has examined market conditions and believes that under present conditions there is no prospect of a need of restriction. So long as the London price does not fall below two shillings a pound, with the increased demand there seems to be no danger of overproduction for two or three years, at least, even if the Brazilian cost price were reduced far enough to allow the Pará sales to rise to 35,000 or 40,000 tons again. It seems a proper time to put the plantations in order, to improve the trees and the cultivation and not worry over valorization.

The London prices for the highest grades for future delivery in the first six months of 1920 went as high as 2 shillings 4¼ pence; first latex crêpe rose from 22 pence in June to 28 pence in September, while hard Pará in the same period went up only a half penny, and the better grades of plantation are taking its place. It will not be surprising if the curve of plantation prices does not again rise as high as that of Pará prices. The stocks in Europe and Malaya are in hands that are able to hold them. The formidable increase in consumption in the United States indicates that the Malay production will be absorbed into a regular channel, and the market pays no heed to the steady increase in Malayan production.

With regard to the establishment of new markets in Europe for the sale of rubber the *Bulletin* quotes a specialist's opinion. He believes that the change made during the war, by which the great increase in the United States demand was supplied by sales and shipments direct from the Straits, renders the success of new markets doubtful. London must retain its place as the center for future sales, while Antwerp and Hamburg are favored by their geographical position. A few years before the war broke out France tried to establish a rubber market at Havre, counting on regular shipments from the French Congo, but the experiment was a wretched failure. Any market scheme counting on the importation of wild rubbers by the countries whose colonies produce it, seems likely to fail because the impurities of those classes of rubber increase the relative cost of importation and diminish their usefulness so that dealings in them will become steadily less remunerative when competing with lower-priced plantation rubber.

The Rubber Trade in Great Britain.

By Our Regular Correspondent.

THE POSITION of affairs remains much the same—plenty of orders on hand and difficulty in executing them, owing to strikes in this or that direction. Transport and the delivery of letters were much hampered by the nine-day railway strike, which undoubtedly owed its collapse to the rapidly improvised motor truck service all over the country. The strike of iron molders, which lasted three weeks, caused serious delay in the engineering trades, and rubber works in course of installing new machinery have had a serious setback.

DETERIORATION OF RUBBER.

It is not often that rubber works keep their purchases of plantation rubber for three or four years without turning the rubber out of the boxes for use or inspection. I had a case of this sort before me recently, however, when it was found that the rubber was very much decayed and quite unfit to be used for a good class of work. I do not suppose the seller would be prepared to consider redress after three years, though, I hardly think that much good quality plantation rubber will be found to have gone wrong even if it is kept for three years. I have reason to suppose that in this case the rubber which was sold as clean brown crêpe was not *Hevea* rubber but the product of some other tree which yields a rubber more prone to decay. I do not know that it is always customary for the term *Hevea* to be used in dealings between buyer and seller, and the point seems one of importance as premature decay of the rubber after manufacture might lead to considerable trouble. This would be especially annoying to firms with a reputation and desirous of buying a high quality rubber for import.

BENZOL POISONING IN PROOFING.

In the Factory Inspector's Report for 1918 reference is made to several cases of poisoning by benzol fumes, two or three of which proved fatal. I remember that early in that year all rubber works received an official request to state whether they used benzol in their establishments, though the reason for the inquiry was not stated. Speculation, therefore, was rife on the matter which it was thought had something to do with attempts to cheapen production of government munitions by the use of benzol at a low controlled price instead of solvent naphtha at over 4 shillings per gallon for which it was then selling. However, it is now clear that the inquiry was on hygienic grounds only. As a solvent in proofing, benzol has never been popular because of its high volatility, as compared with solvent naphtha, and because a solvent boiling at a uniform temperature does not give as good results at one boiling over a range of 30 to 40 degrees, such as solvent naphtha. In the case of rubber solutions as distinct from rubber "doughs," volatility has always been a desideratum, and it has been a common thing to use a mixture of solvent naphtha and light petroleum spirit.

It would seem from the reports of the fatal cases that these need not have occurred if there had been proper ventilation of the work rooms. It is now recognized by the Factory Inspection Department that the alternative for forbidding the use of benzol in rubber works is the installation of efficient ventilation, and this requisition seems now to have been generally and readily complied with by the manufacturers. Now that benzol has risen in price and the sale is controlled by a ring of producers, mainly for motor purposes, I doubt if it will continue to find its war-time uses in rubber works.

The report contains an interesting reference to a new rubber solvent which was recommended to the trade by a government department in 1918. It is a xylol compound, stated to consist half and half of hexamethylene and metexylol. Members of the Medical Research Committee reported that it could be used as a rubber solvent with much less danger than benzene.

NORTH BRITISH RUBBER CO., LIMITED.

The profit to the North British Rubber Co., Limited, for 1918, after making allowance for excessive profits duty, was £180,512, and with the balance brought forward there is £145,842 for disposal. It goes without saying that the profits were maintained despite the fact that labor, coal and all other charges showed an increase. This is almost the univarsal case with reports of manufacturing businesses at the present time.

The report states that since the signing of the armistice, and notwithstanding the cessation of practically all war contracts, the output of the works has not been seriously affected. Certain important resolutions referring to alterations in the articles of association and to the increase of capital are to be submitted to an extraordinary general meeting of shareholders. It is proposed to transfer to reserve £100,000 in respect to depreciation previously debited to profit and loss in excess of what was necessary, and to capitalize that amount by issuing fully paid shares to the ordinary shareholders on the basis of two shares of £1 for each ordinary share of £5, it being proposed to divide these £5 shares into £1 shares. It is further proposed to issue £150,000 ordinary shares at a premium of 2*s.* 6*d.* per share in order to develop the productiveness of the works.

RUBBER RESEARCH ASSOCIATION FORMED.

The Research Association of British Rubber & Tyre Manufacturers was registered in London on October 9, 1919 as a limited liability company, not joined for purposes of profit. Its objects are to promote research and scientific work that may be of use to the rubber, tire and kindred industries. The number of members is declared to be 200; they are divided into ordinary, associate and honorary. The association is to be run by a board of managers, and care is taken in the articles of incorporation to keep out foreign control.

ABNORMAL DEMAND FOR TIRES IN ENGLAND.

There is an abnormal demand for motor tires in England, owing to the railroad strike during which the wear and tear on the tires of the cars used for transportaion was very great. The shortage is likely to continue for some time. It is understood, also, that Germany is going to set up motor transportation on a large scale, as the German railroads are badly worn out. This would call for something like 20,000 tons of rubber for tires, which would have to be imported from the United States and England.

G. E. C. RUBBER-COVERED CABLE.

The Pirelli general cable works at Southampton, England, is producing G. E. C. tough rubber-covered cable in all sizes—single, twin or three-cored, which is particularly suitable where a flexible cable, likely to be subjected to rough usage, is needed. Each core, of the best H. C. tinned copper wire, is insulated with vulcanized india rubber, and the whole is then sheathed with tough rubber that is water, oil, alkali and acid proof, and will withstand the roughest use that can arise in industrial work. It can be put directly into new plaster when used for house wiring. On account of its peculiar qualities the Institution of Electrical Engineers provides in its wiring rules for the employment of that cable

RUBBER SPONGE MANUFACTURE IN FRANCE AND AMERICA.

ACCORDING to A. Hutin in *"Le Caoutchouc et la Gutta Percha,"* the manufacture of rubber sponges, which flourished chiefly in Germany before the war, has been commenced in France.

There are numerous recipes both for the rubber compound and for the liquids utilized to produce the spongy effect by liberating gases during vulcanization that form bubbles of uniform size distributed equally throughout the mass. One of the best compounds follows: Pará rubber, 460 parts by weight; golden sulphuret of antimony, containing 2 per cent of free sulphur, 60 parts; washed chalk, 90 parts; lime, 1 part; sulphur, 30 parts; carbonate of magnesia, 20 parts; lithopone, 150 parts; zinc white, 79 parts; barium sulphate, 40 parts; wheat starch, 40 parts; olive oil, 15 parts; castor oil, 15 parts.

The rubber is worked between slightly warmed rollers for four to five hours to render it quite soft. Mixing takes an hour, as follows: the softened rubber is first treated with the mixed oils added in small quantities, then the starch is added, next the intimately mixed ingredients and finally the sulphur constituents.

The liquid for causing the formation of bubbles is composed of 90 per cent alcohol, 120 parts; aniline blue, 1 part; amyl acetate, 2 parts. The mixer rolls are kept well cooled and run slowly to reduce loss by volatilization, the liquid being sprinkled on the mass by degrees. If added too quickly the liquid does not become intimately incorporated with the mass. About 40 to 45 minutes is the average time required. The mixing rolls are set close together and later the distance is gradually increased. Air bubbles must not be allowed to occur in the mixture or unduly large cavities will be formed thereby during vulcanization.

The mass is next made up into rectangular cakes about 1⅛ by 1⅜ by 2¼ inches in a press, the dimensions being such that the cakes do not come in contact with the walls of the vulcanizer. The thickness of the cakes is important. If too thick, vulcanization may be imperfect; if too thin, an overcure may result. The forming press must be kept cool and the cakes vulcanized at once on removal from it. The upper surface of the cake is wiped with benzine and painted over lightly with oil, while the lower is merely oiled and the sides covered with silk paper.

The vulcanizer is of rectangular section and jacketed for steam, which is admitted at a pressure of 65 to 70 pounds per square inch for fifteen minutes before vulcanization is begun. The cake is then laid on a piece of wire gauze in the vulcanizer and covered with a light cotton fabric. Vulcanizing time and conditions must be ascertained by practical experience. Steam must not be allowed to come in direct contact with the cake.

AMERICAN METHOD.

In general, American practice in the manufacture of rubber sponge follows that recorded above. It was developed first in the laboratory of The B. F. Goodrich Co. at Akron, Ohio, shortly following the appearance of the first commercial rubber sponge which originated in Russia in 1897.

It is found advantageous to set aside the rubber sponge mixing to age for several days; even as long as a week or ten days does no harm. The inflating material commonly used is carbonate of ammonium in powder form.

In preparation for vulcanization the stock is run out by a tubing machine in the form of a bar of appropriate cross-section to inflate to the thickness of sponge desired. The raw stock is cut approximately one-third the bulk of the cured product and laid in an aluminum trough for curing in open steam.

Before vulcanization is begun the heater is charged with air at 45 pounds' pressure, which pressure is subsequently gradually displaced with steam pressure, to be later still displaced by air pressure under which the cured sponge is held until cooled sufficiently to obviate all danger of internal splitting.

As soon as removed from the vulcanizer the thin skin or surface of the bar of spongy rubber is promptly broken to prevent damage by excess internal pressure. The walls of the sponge cavities are systematically broken by passage of the cured bar of sponge through an ordinary clothes wringer. This establishes connection with the outer air throughout the mass and renders the finished sponge light and absorbent.

The sponge is completed by cutting it from the cured rough form by means of a hand cutting die, after which the outer skin or surface rubber is removed by a machine knife with rapidly revolving blades somewhat after the style of a lawn-mower blade. By properly housing the blade of such a cutter it is possible to remove the surface from the sponge by simply passing it lightly over a suitable opening which permits the blade to come into contact with the rubber.

THE GERMAN RUBBER MARKET.

IN AN ARTICLE on the development of a German rubber market, the *"Gummi-Zeitung"* comments on the experiences of the German rubber industry during the war. German's rubber industry in the year 1913 worked up in round numbers 16,000 tons of rubber, of which a third was exported in the form of rubber goods. During the war as time went on the boundaries were closed more and more to the importation of rubber. If the industry in spite of the steadily increasing demands of the army was able to satisfy them, this was due to three circumstances:

(1) Certainly hitherto no substitute material had been found which in any degree possesses the quality of natural rubber and could compete with it, but certain materials have value as helping Para rubber as additions and their use in special cases will continue even after the war. Still, when great demands are made on the materials they cannot take the place of new rubber. In other cases the Germans set aside rubber entirely and used other materials in its stead (as in the case of elastic metal tires).

(2) The working up of old rubber was improved and for this reason we may expect in the future a saving in rubber, as we have not yet got the ideal regeneration process and for good material we must in the future turn to new rubber.

(3) An important part in the German rubber economy was played by synthetic rubber, which was prepared in the last year of the war to the amount of 2,000 tons. This is the methyl rubber of the color factory formerly Friedrich Bayer & Co. in Leverkusen, which to be sure can be properly used in hard rubber goods only. But during the war they have succeeded in making progress in the preliminary for the manufacture of better kinds of artificial rubber. They have learned to prepare acetone out of calcium carbide and further isoprene out of acetone and setacetylene. There is no doubt that German science working on a scientific basis will become master of the difficulties in case it has an inducement to continue on the way it had entered upon.

What seems to be the future of the rubber market? In answering this question we must consider that the production of rubber and still more the consumption of rubber is very extensible. If there is a shortage of rubber and prices rise, the plantations can increase their tapping and all sources of rubber which are stopped up now by low prices will flow again. The consumption can be easily limited by substitute and the increased preparation of old rubber. On the other hand, if the market is flooded the plantations can limit their production and a few wild rubbers like the African will be more or less driven out while the consumption on account of the many ways in which rubber can be utilized will quickly increase. These means of regulating will apparently give the rubber market a certain steadiness.

Variations in price and surprises such as marked the period of the rubber crisis of 1913 may for the present be disregarded. Thus, in the rubber market in London in the first half-year of 1919, prices are steadily held to the line of development around

2 shillings a pound for first latex crêpe. This price leaves to the plantations in so far as they are not overcapitalized, a good profit, for the cost of production is only from ½ to 1 shilling a pound. The production for coming years is estimated at 300,000 tons for 1919 and 340,000 tons for 1920. The consumption, too, should increase in proportion since without considering the possibilities for new means of utilizing rubber, a greater extension of the automobile industry as well as of airplanes and balloons is to be expected.

Germany possessed before the war an important market for middle-class rubber in Hamburg. Since 1911 the future business in actual goods had become possible and it was planned to extend the market by establishing a time exchange for rubber. It is impossible to continue these efforts on account of the lack of money and ships in Germany will have to turn to foreign markets for the supply of its rubber needs. Probably England will be ready to deliver the crude material under favorable and easy terms the more because there is rather an abundance than a lack of it.

The London market will be strengthened in its contest with New York if the Central Powers could be counted on as customers. On the other hand, too harsh conditions would drive German buyers to other markets like Amsterdam, Antwerp and especially New York and to the further perfection of the working up of old rubber, rubber substitutes and artificial rubber.

A RUBBER SUNDRIES ASSOCIATION.

The Central Union of the German Surgical Rubber Goods Trade was formed on October 11, 1919, at Frankfurt am Main. It includes three sections: wholesale dealers, retail dealers, and exporters, and hopes to take in all firms engaged in the business. The president is A. Ederheimer, of the house of Gebrüder Weil in Frankfurt, and the manager is Dr. Ernst Mosbacher, also of Frankfurt. The office is at 42 Hochstrasse in that city.

BELGIUM'S RUBBER COMMERCE.

BELGIUM IN THE FIRST SEVEN MONTHS OF 1919 IMPORTED 5,525,715 pounds of rubber valued at $2,877,084 at normal exchange, and exported 244,196 pounds worth $175,096. She also imported rubber tires valued at $2,580,153, and other manufactured rubber goods valued at $720,018.

ANTWERP RUBBER AUCTIONS RESUME.

Proof that the Antwerp rubber market is once more in full swing is shown by the list of lots sold at auction by the well known commission house, Grisar & Cie., on November 11, Armistice Day. They amounted to 1,415 tons of Congo rubber of all grades, with a small quantity of other African rubbers and were offered chiefly by the noted firms, Société Coloniale Anversoise, Bungé et Cie. and Crédit Colonial & Commercial, which was formerly L. & W. van der Velde, with a few lots from Osterrieth & Cie. and Willaert Frères. The bulk of the rubber is made up of red Congo Kassai and upper Congo, équateur black and red, though a little lower Congo appears. The quality indicated by the valuation ranges from 2.75 francs to 5.70 francs a kilogram, but for the great mass of the rubber ranges between a little below and a little above 4.50 francs a kilogram, or around 40 cents a pound.

RUSSIAN RUBBER FACTORIES AT WORK.

At the present time three of the national rubber factories of Russia, formerly known as the Treugölnik," the "Bogatyr" undertaking and the "Kautschuk," are actually working and turning out mechanical rubber goods. They have received extensive and firm orders from the railways, the sugar industry, the Commission of Health and other services. Their stock of raw material will presumably suffice them for one year on a severely restricted scale.

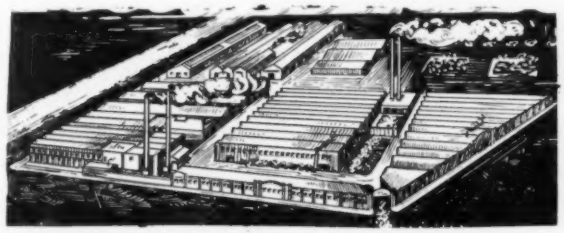
The position as regards fuel is bad. The "Treugölnik" factory has had its stock of fuel commandeered by other works, such as the electrical power station. In this large factory, intended to employ 18,000 workers, there are now only 4,500. Rubber is being used for shoe soles as a substitute for leather.

THE RUBBER TRADE IN AUSTRALIA.

Special Correspondence.

RUBBER MANUFACTURE in this part of the world is steadily increasing its output and broadening its market. There are three rubber factories in Australia and these are in a very satisfactory position financially, and in regard to the quality of their goods and the standard of their output.

The pioneer is the Barnett Glass Rubber Co., the year of whose formation dates back to the 'seventies. It is to-day in a healthy condition, testifying to the perseverance of Mr. Barnett



THE BARNETT GLASS RUBBER CO., LIMITED, MELBOURNE.

Glass, the founder, and his coworkers, through the many vicissitudes that have been the lot of the rubber industry here in Australia. While the Barnett Glass company was making a beginning in manufacturing waterproof goods the Perdreau Co., as rubber merchants in Sydney and soon after as an incipient manufacturer in Melbourne, was also helping to start the rubber industries of Australia.

The Dunlop Co. of Australia, which had its inception in Melbourne as an agency of the British Dunlop company in the late nineties, also began to manufacture on a small scale. Its factory last year employed 3,500 hands, imported 70 tons of rubber a month, and turned out more than a thousand different kinds of rubber goods. Tires are of most importance, as is the case with all the Australian manufacturers, and the company also makes a special conveyor-belting.

It has been the desire of manufacturers here to supply, regardless of expense and inconvenience, any rubber article that the market may demand, and in this they have been successful. At the outbreak of the war they readily came to the country's aid and accommodated themselves to making the particular rubber goods necessary for carrying on the war. The result was that the Department of Defense has no anxiety regarding these articles and were sure that any demand would be supplied.

The use of plantation rubber is being largely extended here, and satisfactory results are obtained. The need for scientific research is fully recognized by manufacturers, and in order to be in position to manufacture any of the many rubber articles in existence it is obvious that much experimental work is necessary.

The lot of the rubber manufacturers in Australia is not an easy one, for difficulties and obstacles are many. The characteristic resourcefulness, determination and enterprise of the Australian manufacturer was never called into play more than in the establishment and successful carrying on of the industry. One of the handicaps is that the home market is limited, making the initial cost so great that a long interval must elapse before a reasonable profit is obtained. Added to this is the distance from the continent whence the raw products must be obtained, and the high price of labor. These factors make competition with importers difficult and the exportation to other countries scarcely possible.

Congo Rubber a Big Asset of Belgium.

By S. P. Verner.

HER CONGO COLONY may become one of the most valuable assets of Belgium in her efforts to rebuild her once flourishing trade and industry. The chief point to be observed by the Belgian Government in its colonial policy is to conserve and develop the labor of the natives. Failure to do this was the weak point in the old régime ten years ago, but now King Albert may be expected to inaugurate a system which will correct past mistakes and make Belgium's big African territory a source of wealth to both Belgium and the natives of the Congo.

The principal needs of the Congo are three: an adequate sanitary service; the raising of food supplies; and the development of special industries whose products are so valuable as to be profitable notwithstanding the great distance of the Congo from the markets of the world.

Rubber, ivory, minerals and oils are the four chief industries in the Congo which will bear the expense of transportation and still yield good profits. Of these, rubber is one of the most immediately valuable. The old system of rubber collection by the natives yielded large profits, but it led to certain results which damaged the industry. The natives were willing enough to gather rubber at first, and they went into the business to the extent that more than $10,000,000 of rubber per annum was produced in King Leopold's day.

But the African natives could not eat rubber. Agents of King Leopold's government and of the commercial companies in which he was largely interested did not always appreciate the fact that they might easily kill the goose that laid the golden egg, or rather the African, whose labor produced the precious caoutchouc, when they insisted that the natives turn from agricultural pursuits to gathering wild rubber to such an extent that famine resulted in many districts.

TAPPING LANDOLPHIA VINES.

When the rubber buyers began to bring pressure to bear on the natives to go into the forests and get rubber, the white traders did not bring food supplies into the country, but vaguely supposed that the greatest abundance of food was available locally. This was true in some districts where there was a sufficient number of unemployed natives to enable the rubber business to be carried on without interfering with food production. But in other districts this was not the case, and an American explorer chanced to see what happened to some Congo tribesmen while they were engaged in catching and smoking fish, upon which several villages were accustomed to subsist from one season to another.

One day, at the height of the fish curing season, a message came from one of King Leopold's officials, ignorant of local conditions, ordering the men engaged in this business to come immediately to his post in order to carry cargo for a rubber buying expedition into the interior. This meant the abandonment of the fish curing, since no compromise was entertained by which some of the men might be left to carry on the work. In fact, the order included a large number of women, who had to go to carry food supplies and camp equipment for the use of the men on the trip.

The result was that the whole population of several villages was limited to one month's supply of food, whereas, but for the interruption, a year's supply would have been secured in another month. When the porters returned after a three months' trip, they brought back cloth, sea-shells and beads with which they had been paid for their work, but there being no supply of food in the country, these articles were useless, except by making a long journey to a distant region where they might barter them for food.

Such a practice caused many of the revolts which led to wars and suffering, caused the decline of the population, made very much less labor available for the rubber industry, and caused many of the white men to be cordially hated. A more intelligent policy, without necessitating the expenditure of any more capital would have avoided this, and have increased the output of the rubber.

Rubber gathering in the Congo was both fascinating and exciting to the natives, and not by any means unpopular if properly managed, as in the earlier days of the African rubber industry. The fascinating part of the business consisted in the incidental pleasures of the chase and of camping out. Young men from a village on the African plains would pack up their belongings, march to the heavy forests along the river courses, and seek for a place where the rubber vines grew in abundance. Sometimes such a locality would be forty or fifty miles away from their homes, and it would take two or three days to get there. Then they would first put up rough palm-thatched huts, start their camp fires, and hold a religious meeting in which the medicine men would bless the undertaking, curse all their enemies, two-footed and four-footed, and see that each man had his fetish in working order. The rubber gatherers would then scatter

through the woods on a roughly prearranged plan, generally about four to each group.

The three commonest sources of rubber in the Congo are the *Landolphia Owarienses* vine, which produces red rubber; *Landolphia Klainei*, which produces black rubber, and a tree, the *Funtumia elastica*, which also produces black rubber. Of these, the first is the most valuable and furnishes the bulk of the Congo rubber. Some of the large *Landolphia* vines grow to a

RUBBER GATHERERS' CAMP.

thickness at the bottom of 18 inches and are 200 feet long. They clamber over the tallest trees in the forest, making big loops and festoons, and they produce a fruit as large as a man's head, the seeds of the fruit being coated with a thick, gummy substance which is sweet and eaten freely by the natives. A vine of this size is a veriable veteran of the forest, and is not often found, though in places where it is abundant, such big vines may sometimes be found to the number of fifty to the square mile. Smaller vines occur more frequently, and thirty or forty of them to the acre is a fair estimate.

When the *Landolphia* is tapped, the juice oozes out slowly in a white, milky shape, and coagulates quickly upon exposure to the air. The slow bleeding of the vine is an extremely valuable characteristic of *Landolphia*, as the rubber coagulates on the bark and does not fall on the ground, unless the cut be too large and deep. Many other rubber plants must have vessels attached to them or placed under them to catch the rapidly flowing juice, and this increases the expense of collection. With the *Landolphia*, a slit under the bark six inches long and two inches wide will allow the juice to ooze out slowly, and if the slit be made in the afternoon, by the next morning a solid chunk of rubber may be detached and pulled out of the wound.

Such big vines as that just described might produce ten pounds of rubber per year without being seriously injured. The smaller vines produce in proportion. It may be said in general that five per cent of the weight of a *Landolphia* vine is rubber, though, of course, this rule is subject to many conditions. The black rubber has to be collected in vessels or in containers made of large leaves, and coagulated by heat or the use of the acid juice of certain plants.

The quantity of rubber which one man can collect varies enormously according to locality and the conditions, but on the average a native who spends the dry season of about five months collecting rubber might be expected to return with 100 pounds, worth between $75 and $300, according to the state of the market in Europe or the United States. He would get between $15 and $60 for it from the traders in the Congo. This looks like ridiculously poor pay for the natives, but it must be remembered that, at least in the early days of the trade, the rubber gatherers spent much of their time hunting game, and regarded the rubber as pin money.

An American explorer once accompanied one of these expeditions into the forest and made the experiment of personally supervising the collection of the rubber for a week in order to form an idea of the maximum capacity of native labor and of the rubber resources of the forest, if the work were done on a thorough business basis, eliminating all other forms of occupation. He found that under this system a native in a fairly good locality might collect three pounds of rubber a day on the average. He also estimated that all the heavy expenses of transportation from the Congo to Europe, the overhead charges, and other expenses might be made with a profit of 30 per cent to the business, if the natives were paid 30 per cent of the European market value of the rubber. On this basis, at the price of $2 a pound for red rubber, the natives could be paid as high as $2 a day for their labor in the forest. Such wages, of course, were never obtained by the natives, but the excess profits were taken by the rubber company. At one time a fierce régime of competition set up in the Congo, that raised the rates of pay of the rubber gatherers to a high figure, but this was soon eliminated by the formation of large rubber trusts.

While rubber gathering on the voluntary system and stimulated by decent commercial methods was often a veritable picnic to the natives, the sort prompted by force, directly or indirectly, became the cause of great misery and suffering. For example, under King Leopold's régime, a government official might count noses in a village and give an arbitrary order to the native chief that the village must produce a certain quantity of rubber annually under penalty of heavy fines or imprisonment. The government officials rarely took the trouble to inform themselves specifically about the conditions under which specified amounts of rubber would have to be collected. They

FOREST OF "LANDOLPHIA" VINES.

did nothing to render the work easy, but simply issued their orders and then punished the people if the required amount of rubber was not forthcoming.

If the village endeavored to comply, it often meant that every man, woman and child over eight years old would have to move into the depths of the forest and gather rubber nearly all the year. This meant the abandonment of their fields and farms, upon which their livelihood depended; as the traders did not give them food in exchange for their rubber, and as all the

other villages were in the same situation, it meant famine in every district in which this system obtained. Besides this, the life in the forests, while pleasant enough to selected groups of vigorous young men for a certain length of time, is dangerous

RUBBER MADE INTO CAKES AFTER BOILING.

and unhealthy in the rainy season, and is unsuited to permanent residence at any time.

Peremptory orders of this sort were also resented by many of the powerful chieftains, and led to wars in which the savage soldiers would be employed against rebellious natives with all the horrors of that sort of warfare, and with many instances of actual cannibalism.

Such measures were totally unnecessary in order that white men engaged in business in the Congo might make handsome profits. The natives are able to live very cheaply because of the fertility of the soil and the tropical climate, so that only a small percentage of their time is necessary to raise food and other supplies that they need. A wise system which would set

THE CONGO RAILWAY AT CITAS.

aside definitely a certain time every year for the raising of crops and always maintaining a wise balance between the labor devoted to self-support and to obtaining rubber would avoid all of the evils of the old régime, and cause the country to enjoy an immense prosperity.

For example, one might take the case of a town of 5,000 people living at the head waters of the Kassai river at Wissman falls, with which the writer is personally acquainted. This village is situated on an elevated plateau within ten miles of a forest fifteen miles wide and several hundred miles in length, rich in rubber. This village could raise food supplies enough for the whole population with the labor of one-third of the population, while another third would be available for rubber gathering in the dry season and for such general industrial purposes as might be developed under white stimulus and direction during the rainy season. The town might produce under such an arrangement at least 100 tons of rubber per year, worth $200,000. The imported cloth, steel, iron and other articles which the natives would obtain with this rubber would increase the wealth and comfort of the town, meanwhile the remaining third of the population might still be engaged in agriculture, and, under white superintendents, in building roads, constructing better houses, operating saw mills, etc.

If the entire French and Belgian Congo were organized upon some such basis as this, at least $75,000,000 worth of rubber could be produced per annum.

STANDARDIZING PLANTATION METHODS.

From the fact that there has been very little change in methods of cultivation, tapping and preparation of rubber in the last few years, "The India-Rubber Journal" thinks that plantation operations have become standardized.

Even tapping operations have become more uniform; on most estates the quarter or third section system is used, one cut per tree. Frequency of tapping still varies in different countries and districts, but is usually either once a day or on alternate days. Many of the older systems have practically disappeared; "we used to hear of the half-spiral, full spiral, half herring bone, full herring bone, V, inverted V, basal and ladder tapping." The whole tendency is now towards economical bark consumption, and one cut per tree, instead of three or more, is the usual practice. As the trees grow bigger, to a girth of 50 inches or more, two cuts per tree will probably be the fashion.

The question of the number of trees to the acre is also being settled, a maximum of 80 trees with a minimum of 40 trees per acre being the ideal striven for, instead of 100 trees or more an acre.

In the factories, acetic acid is practically the only coagulating agent used, and hundreds of estates are using the same types of machinery and methods of curing for their smoked sheets and crêpe.

ALDENS' SUCCESSORS, LIMITED, IN THE FAR EAST.

Aldens' Successors (Eastern), Limited, Penang and Singapore, as of October 1, 1919, took over the business established in 1917 by R. F. Bradford as eastern representative of Aldens' Successors, Limited, of London, and incorporated with the following board of directors: A. G. Gumpert, London; Willy Friling, Antwerp; William H. Hildreth, London; E. Stevenson, London, and R. F. Bradford, Singapore, managing director. The business will be mainly in rubber and produce and an office has been opened at No. 4 Collyer Quay, Singapore, under the direction of Mr. Bradford. The Penang office will be in charge of F. D. Thompson.

PROPERTY OF THE SOCIETE FINANCIERE DIVIDED.

A partition of property has been made between the two corporations into which the Société Financière des Caoutchoucs has split; the French group, which retains the old name, will control the two plantations in Java, the eight in Sumatra and two in the Malay peninsula, while the Belgian group, the new S. I. P. E. F. (Société de Plantations et de Finances) will keep five plantations in the Federated Malay States.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED OCTOBER 7, 1919.

NO. 1,317,831. Tire structure. J. G. Smith, assignor of ¼ each to O. N. Barnett and L. C. Banmer—all of Port Arthur, Tex.
1,317,839. Syringe. G. J. L. Vermont, Flint, Mich.
1,317,851. Syringe. F. R. Arnett, Philadelphia, Pa.
1,317,928. Combined suspender and brace. A. J. Lobar, New York City.
1,317,947. Respirator. W. Solderling, New York City.
1,317,970. Sadiron wax pad. G. E. Gaver, Baltimore, Md.
1,317,976. Butt-end inner tube. J. F. Hower, assignor to the Firestone Tire & Rubber Co.—both of Akron, O. (Renewed August 15, 1919.)
1,317,978. Stocking supporter. H. Keys, Ellensburg, Wash.
1,318,026. Tire filler. B. Tamburello, New York City.
1,318,066. Fountain brush. C. A. Garvey, Clayton, Mo.
1,318,077. Tire boot. G. A. Harmuth, Drumright, Okla.
1,318,095. Tire interliner. J. P. McDonald, Orange, Tex.
1,318,119. H. B. Wallace, St. Louis, Mo.
1,318,172. Shower-bathing apparatus. H. W. Patrick, Mansfield, O.
1,318,270. Resilient tire. W. F. Farnsworth, Washington, D. C.
1,318,274. Demountable rim for tires. B. F. Gowdey, Englewood, N. J.
1,318,295. Demountable rim for tires. J. McM. Loveless, assignor of ½ to C. C. Wilton—both of Glezen, Ind.

ISSUED OCTOBER 14, 1919.

1,318,534. Demountable rim for tires. J. L. Bredar, Rock Island, Ill.
1,318,575. Tire filler. J. L. Miller, Fort Collins, Colo.
1,318,593. Hob-nailed rubber boot or shoe. C. J. Randall, assignor to The Goodyear's Metallic Rubber Shoe Co.—both of Naugatuck, Conn.
1,318,645. Unattached vulcanized rubber sole for boots and shoes. M. H. Clark, Pelham, N. Y., assignor to Boston Rubber Shoe Co., Malden, Mass. (Continuation of application Serial No. 99,255, filed May 22, 1916, and a division of application Serial No. 107,853, filed July 6, 1916, which is a continuation of application Serial No. 878,935, filed December 24, 1914.
1,318,652. Rubberized bathing-suit holder, with patent fastening device. J. D. Farkas, New York City.
1,318,872. Surgical appliance. M. N. Hofstetter, New York City.
1,318,873. Valve cap. E. E. Holt, assignor to Holt Auto Devices Co.—both of Chicago, Ill.
1,318,876. Salvaged-edge tire fabric. K. W. Jappe, assignor to The Miller Rubber Co.—both of Akron, O.
1,318,885. Cap for fountain syringes, etc. H. P. Kraft, Brooklyn, N. Y., and M. C. Schweinert, West Hoboken, N. J.
1,318,911. Nipple for nursing bottles and holder for same. A. Pfrommer, Philadelphia, Pa.
1,318,917. Cap for inflating valves. E. E. Poston, Campbell, Calif.

ISSUED OCTOBER 21, 1919.

1,319,110. Tire construction of fabric and rubber, reinforced with spring bands. J. W. Price, assignor of ½ to H. T. Miller—both of Henryetta, Okla.
1,319,155. Dust cap for tire valve, etc. H. P. Kraft, Ridgewood, N. J.
1,319,297. Device for attaching nipples, caps, etc., on containers. W. P. Limacher, Pasadena, Calif.
1,319,337. Belt and belting with elastic core, etc. L. Heimann, assignor by mesne assignments to Live Leather Belt Co., Inc.—both of New York City.
1,319,491. Artificial foot. J. F. Rowley, Chicago, Ill.
1,319,539. Resilient tire. C. H. Tondeur, Canastota, N. Y.
1,319,549. Pneumatic tire. T. W. Willerton, Bloomingdale, Mich.
1,319,556. Writing instrument similar to fountain pen. E. O. Baker, Shanghai, China
1,319,564. Crutch and cushion tip for same. M. Bruyere, Green Bay, Wis.
1,319,593. Fountain pen. B. Laffitte, Merida, Mexico.
1,319,604. Hip brassière attachment for corsets. F. C. Morse, New York City.

REISSUE.

14,740. Attachable heel for shoes or boots. G. Schrade, New York City. (Original No. 1,298,104, dated March 25, 1919.)

ISSUED OCTOBER 28, 1919.

1,319,697. Pneumatic tire. De L. Davis, Chicago, Ill.
1,319,726. Combined pneumatic and cushion tire. H. H. Schramm, New York City.
1,319,738. Bath-shower head, etc. E. G. Watrous, Chicago, Ill.
1,319,864. Cushion or solid tire and method of manufacture. J. E. Hale, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,319,865. Reinforced cushion tire. J. E. Hale, and E. F. Brunner, assignors to The Goodyear Tire & Rubber Co.—all of Akron, O.
1,319,895. Safety tread for stairs, etc. W. R. Ormes, Waltham, assignor to Universal Safety Tread Co., Boston—both of Massachusetts.
1,319,991. Tire-holding means, including rubber band. J. T. Clark, Provo, Utah.
1,320,025. Pad for bicycle pedals T. R. Palmer, Erie, Pa.
1,320,104. Demountable rim for tires. B. Tamburello, New York City.
1,320,105. Truss with inflatable pad. E. B. Toll, Yakima, Wash.
1,320,207. Hose supporter. W. W. Colson, Jacksonville, Fla.
1,320,221. Non-pneumatic rubber ball and process of manufacture. K. Fukuda, Tokio, Japan.
1,320,286. Vaginal syringe. F. W. Stanton, Chicago, Ill.
1,320,304. Pneumatic tire. J. B. Zimdars, San Francisco, Calif.
1,320,364. Arch support. S. H. Boone, Chicago, Ill. G. T. Kimmel, administrator of said Boone, deceased.

THE DOMINION OF CANADA.

ISSUED OCTOBER 7, 1919.

193,050. Tube for pneumatic tires, having rim side reinforced with embedded fabric strips permitting longitudinal transverse and diagonal expansion. A. E. Henderson, Toronto, Ont.
193,051. Tube for pneumatic tires, having roms side reinforced with embedded fabric strips permitting transverse and longitudinal expansion. A. E. Henderson, Toronto, Ont.

ISSUED OCTOBER 14, 1919.

193,161. Suspensory bandage with adjustable elastic straps. A. R. Chisholm, New York City, U. S. A.
193,227. Spring tire. T. Salari, Bisbee, Ariz., U. S. A.

ISSUED OCTOBER 21, 1919.

193,307. Cushion for inner tire. J. W. and G. F. Burgess, coinventors—both of Kansas City, Mo., U. S. A.
193,326. Resilient tire divided into two parts, one inflatable. A. A. Crozier, London, England.
193,329. Resilient tire. H. R. Davidson, Willows, Calif., U. S. A.
193,340. Core for tires, foldable to position. R. Fukuda, Yoshida Machi, Yokohama, Japan.
193,347. Ventilator for rubber boots, etc. J. V. Hagstrom, Hadlok, Wash., U. S. A.
193,349. Solid rubber tire reinforced with metal and ebonite. H. L. Harding, Loughton, Essex, Eng.
193,353. Abdominal supporter. J. L. Holt, née J. L. Moyer, Portland, Ore., U. S. A.
193,354. Rubber boot reinforced with metal strips interposed between lining and outer coating. E. J. H. Hommert, Granite City, Ill., U. S. A.
193,365. Means for fastening together a pair of rubbers, for hanging up, etc. F. J. Nelson, Halleck, Minn., U. S. A.
193,369. Ventilator for rubber boots, etc. C. A. Patrick, Ockley, Ind., U. S. A.
193,370. Pneumatic tire. L. E. Pickett, St. Louis, Mo., U. S. A.
193,378. Rubber cushion tire. T. C. Watkins, Ingram, Pa., U. S. A.
193,400. Cushion tire. The K., F. & C. Tire & Rubber Corp., Roanoke, Va, assignee of C. L. Van Ness, Akron, O., and F. A. Krussmark, of said Roanoke—both in U. S. A.

ISSUED OCTOBER 28, 1919.

193,433. Pneumatic tire with metal rim. D. Stitely, Laughlintown, and G. W. Shavers, Friedens, coinventors—both in Pennsylvania, U. S. A.
193,434. Spring tire. J. J. Kelarek and P. Dubcak, coinventors—both of Crosby, Tex., U. S. A.
193,451. Compression inner tube for pneumatic tires. N. C. Doss, Atlanta, Ga., U. S. A.
193,463. Spring tire. H. V. Higginson, Inkerman, Ont.
193,471. Inner tube. I. B. Jefferies, Lanelly, Carmarthen, Wales.
193,475. Pneumatic tire. E. B. Killen, London, Eng.
193,477. Spring tire. F. C. Kotze, Newark, N. J., U. S. A.
193,490. Boot for pneumatic tires. J. J. Nichols, Davenport, Wash., U. S. A.
193,493. Rubber heel lift J. H. Overton, Trenton, N. J., U. S. A.
193,540. Casing for pneumatic tires, composed of major circumferential cable in turn composed of minor cables made up of twisted strands of wire, etc. W. Leeper and H. B. Hill, assignee of ½ interest—both of Bisbee, Ariz., U. S. A.

THE UNITED KINGDOM.

ISSUED OCTOBER 1, 1919.

130,364. Self-sealing tanks for petrol, etc., composed of two sheets of rubber, etc. C. A. Cleghorn, Brackenside, Woburn Sands, Bedfordshire, and Gayner Pneumatic Co., 95 Cannon street, London.
130,441. Insulated body for holding electric lamps. H. T. Wilkinson and Wardle Engineering Co., 106 Deansgate, Manchester, Eng.
130,472. Elastic ties for connecting top and bottom surfaces of pneumatic mattress. V. Marchiars, 61 rue de Bonnel, Lyons, France.
130,618. Blow-out patch. L. P. Clark, Fanwood, N. J., U. S. A. (Not yet accepted.)
130,624. Flexible wire hose with gutta percha paper between layers, etc. P. C. Rushen. 28 Southampton Buildings, London, Eng.
130,648. Respirator with pneumatic cushion. A. R. Moody, Richmond Hpuse, Shelton, Stoke-on-Trent, Staffordshire.

ISSUED OCTOBER 8, 1919.

130,676. Respiratory apparatus. G. C. Colna, 16 Ferry Road, Barnes, London.
130,747. Baby's "comforter." F. R. Graham-Yooll, Dulham Towers, East Trinity Road, Leith, Midlothian.
130,765. Cushion tire. H. C. Babel, Buffalo, N. Y., U. S. A.
130,783. Bottle closure. F. Cieszkowski, Robyville, O., U. S. A.
130,931. Tobacco pouch with separate or attached concave piece of rubber for filling pipes. H. Cooley, 206 Broomwood Road, Clapham Common, London.
130,955. Fuel tank coverings modified by addition of sheet of rubber sponge, etc. Dunlop Rubber Co., 4 rue du Colonel Moll, Paris. (Not yet accepted.)

ISSUED OCTOBER 15, 1919.

131,120. Resilient cushion wheel. J. M. Avery, North Texas Building, Dallas, Tex., U. S. A.

ISSUED OCTOBER 22, 1919.

131,390. Respiratory apparatus for divers or aviators. R. Watanabe, 13, 2-Chrome, Kobiki-Cho, Kyobashi-Ku, Tokio.

Chemical Patents will be found on pages 150, 151. Machinery Patents on pages 153, 154.

131,423. Pneumatic tire cover with projecting cushions. T. Dunn, 7 Woodfield avenue, Streatham Hill, London.
131,425. Sole for boots or shoes, composed of layers of canvas and rubber, with or without rubber heel pad, etc. O. R. Williams, Raydaleside, Stanhope Road, Darlington, Durham.

ISSUED OCTOBER 29, 1919.

131,672. Rubber shank stiffener reinforced with metal, etc., for boots or shoes. J. C. Parkinson, 1 Bedford street, Chorlton-upon-Medlock, Manchester, and A. T. Coker, Abington Square, Northampton.
131,734. Straps for supporting corsets from the shoulders. A. M. Dewse, 280 City Road, Sheffield.

NEW ZEALAND.

ISSUED SEPTEMBER 18, 1919.

41,007. Rubber sole with textile base. G. W. Beldam, Boston Lodge, Windmill Road, Ealing, and A. U. B. Ryall, Glamorgan House, Brentford, both in Middlesex, England.
41,978. Mouth-piece for milking-machine teat cup. L. H. Browne, 52 Park Road, Papanui, Christchurch.
42,017. Pneumatic tire. Berendonck's Syndicaat voor Banden in Deelen, 16 Valeriusplein, assignee of P. E. Van Berendonck, Hotel Mille, Colonnes—both of Amsterdam, Holland.

AUSTRALIA.

To Americans.

ISSUED SEPTEMBER 2, 1919.

8,953. Pneumatic tire valve. M. Schweinert, New Jersey, U. S. A.
9,796. Ferrule for walking stick, crutch, etc., with rubber spring. W. M. Follner, New York City, U. S. A.

GERMANY.

PATENTS ISSUED, WITH DATES OF APPLICATION.

307,649. (October 15, 1916.) Resilient tire. Wilhelm Hees, Siegen.
308,671. (March 19, 1916.) Artificial foot of hard rubber or similar material. New York-Hamburg Gummiwaaren Co., Hamburgh.
310,944. (Maorch 24, 1917.) Rubber patch for treads, pneumatic tires and the like. Emmy Thiele, born Mühleise, Magdeburg.
311,031. (October 31, 1916.) Resilient tire. Hermann Rieseler, Hamburg.
311,049. (August 16, 1916.) Elastic tire for bicycles, motors, etc. Ernst Mattern, Berlin.
311,268. (May 22, 1918.) Tire fastener, Theodore Johann Caviez, Bremen
311,365. (November 15, 1917.) Resilient tires. George A. Krause, Munich.
311,455. (May 13, 1915.) Artificial limb, with movable joints. Johannes Wegmann, Linz am Rhein.
311,537. (November 25, 1917.) Resilient tire, Gordon Co., Dresden.
311,571. (April 6, 1917.) Pneumatic springs for vehicles. Alfred Joel et Compagnie, Zürich, Switzerland.
311,685. (March 29, 1917.) Belting, Friedrich Graf de la Rosée Garmisch-Partenkirchen.
311,725. (February 27, 1918.) Injection syringe, especially for one-armed persons. Christoph von Tiedemann, Lübeck.
311,785. (May 22, 1918.) Resilient wheel. Carl Boldt, Rostock. (Additional to patent No. 299,530.)
311,928. (February 2, 1918.) Tire fastening. Gustav Oldermann, Berlin.
312,008. (April 24, 1917.) Resilient wheel. Johann Kolozsvary, Pressburg. (Austrian Patent, April 6, 1917.)
312,080. (November 16, 1917.) Resilient tire. Albert Klafke, Düsseldorf.
312,081. (January 19, 1918.) Spring tire. Hermann Ritter, Köln-Mülheim.
312,406. (July 17, 1918.) Tire fastener. August Abermeit, Berlin.
312,576. (June 25, 1918.) Resilient wheel. Richard Müller, Köln.
313,286. (August 6, 1918.) Resilient wheel, Fabrik J. P. Grüeber, Hagen in Westphalen.
313,503. (April 20, 1918. Artificial leg with adjustable knee. Otto Bucher, Halle on Saale.
313,626. (July 23, 1918.) Elastic bandage. Dr. Karl Lubowski, Berlin.
314,057. (January 31, 1918.) Elastic tube tire with stiff protecting rim. Erhard Junghans, Schramberg in Württemburg.
314,175. (July 19, 1918.) Body bandage. Klara Rockland, born Fischer, Vienna.
314,227. (July 31, 1917.) Solid tires made of rubber substitutes. Carl Jung-Reinhart, Aggsbachmarkt, Lower Austria, and Anton Drexler, Vienna.
314,278. (October 17, 1917.) Resilient tire. Magda Esch, born Ruthmann, Offenbach am Main.
314,279. (November 1, 1917.) Wheel tires for automobiles, bicycles, etc. Paul Knoza, Zerbst, Anhalt.
314,327. (December 11, 1917.) Resilient tire. George Schönwald, Berlin.
314,401. (February 19, 1918.) Resilient wheel tires. Ackermann and Moths, Berlin.
314,575. (June 22, 1917.) Resilient tires. Karl Weiss, Nürnberg.
314,633. (March 1, 1918.) Bandage. Alb. and E. Henkels, Langerfeld bei Barmen.
314,985. (August 9, 1908.) Artificial leg. Prothesis Gesellschaft für Künstliche Glieder, Würzburg-Grombühl. (Addition to patent No. 308,021.)
315,003. (December 28, 1917.) Belting fastener. Fritz Heffner, Nürnberg.
315,181. (May 2, 1918.) Knee joint for artificial leg. Heinrich Schöneberger, Kaiserslautern.
315,717. (February 24, 1914.) Resilient wheel. Carl Herbrechtsmeyer and Friedrich Engelbrecht, Bünde in Westphalen.
315,844. (May 14, 1918.) Woman's automatic, tight-fitting bandage. Richard Laesecke, Stettin. (Additional to patent No. 304,651.)
315,888. (May 18, 1918.) Working arm for those amputated above the elbow. Hans Oberrelter, Vienna.
315,889. (December 15, 1917.) Knee joint. Alfred Habermann, Münich.
313,890. (November 1, 1918.) Apparatus to allow artificial knees to bend. Kiltre Hirsch, Munich.
316,367. (March 1, 1917.) Artificial arm for those amputated above the elbow. (Addition to patent No. 307,594.) Heinrich Troendle, Stuttgart.
316,332. (October 24, 1917.) Arrangement for applying the pneumatic tube and the tread at the same time to the wheel of a motor car or the like. Johann Wessel Brand, The Hague, Holland. (Dutch patent of August 22, 1917.)
316,471. (May 25, 1918.) Resilient tire. Wilhelm Lauenstein, Barnstedt.
316,472. (May 5, 1918.) Resilient tire, especially for trucks, with metal plates inserted in the rim. Alfred Pfetzner, Munich.
316,621. (December 6, 1918.) Casing for pneumatic tires. Arthur von Lüde, Breslau.
316,738. (March 14, 1918.) Tire for automobiles, trucks, etc. Hermann Fritsche, Frankfort am Main.
316,976. (February 13, 1917.) Tire. Carl Schauerte, Hermsdorf bei Berlin.
316,977. (July 1, 1917.) Tire. Carl Schauerte, Hermsdorf bei Berlin.
317,114. (June 8, 1918.) Resilient tire. Walter Diessner, Lüneburg.
317,270. (September 5, 1917.) Prothesis joint that can be regulated. Bokivoj Fink, Prague.
317,286. (April 4, 1918.) Resilient tire. Franz Schenck, Altona. Fabrik C. H. F., Müller, Hamburg.
317,297. (October 31, 1917.) Artificial leg with brake for knee joint.

THE FRENCH REPUBLIC.

PATENTS ISSUED, WITH DATES OF APPLICATION.

493,029. (June 5, 1918.) Wheel tires. W. Leeper and H. B. Hill.
493,154. (November 15, 1918.) Improvement in pneumatic tires. T. Petersen.
493,233. (November 22, 1918.) Repair patch for pneumatic tires. W. C. Wood.
493,277. (November 23, 1918.) Resilient wheel. N. B. Knight and J. K. Hughes.
493,678. (December 9, 1918.) Improvement in pneumatic and other tires. A. M. Poynter.
493,951. (December 17, 1918.) Rubber button for stocking fasteners. P. Pugniet.
494,358. (December 28, 1918.) Automatic inflator for pneumatic tires. P. Jaboulay.
494,208. (January 12, 1917.) Improvements in the manufacture of rubber articles and like materials. T. Sloper.
494,268. (December 30, 1918.) Elastic footwear. A. Carnez, 30 Rue Beague, Paris.
494,468. (January 4, 1919.) Resilient wheel for automobiles. E. Jacqmain and J. Kucharek.
494,701. (January 11, 1919.) Puncture proof pneumatic tire. M. J. Sénéchal, 25 Rue Bergère, Paris.
494,709. (January 11, 1919.) Resilient vehicle wheel. J. Duran Pinñana.
495,100. (January 25, 1919.) Tires for vehicle wheels. J. A. Prince and A. L. Gilles.

TRADE MARKS.

THE UNITED STATES.

NO. 103,392. The word LEE above a star within a circle—golf balls, etc. Harry C. Lee & Co., New York City.
109,059. The words BLUE STREAK—rubber belting. The Goodyear Tire & Rubber Co., Akron, O.
110,392. The word COOLASTIC—elastic bandages for personal wear. Everlastik, Inc., Boston, Mass.
112,419. The words EVER-RITE—rubber heels and soles. E. E. Taylor Co., Boston, Mass.
115,221. Representation of a tire bearing the words and numerals QUICK DETACHABLE 34 x 4 HOOD TIRE CO., INC., WATERTOWN, MASS., and within the tire, in white against a black background, an arrow pointing from left to right and the words EXTRA PLY and HOOD TIRES—rubber tires. Hood Tires Co., Inc., Watertown, Mass.
115,470. The word UNARCO within a double-outlined diamond—asbestos and rubber machinery packing. Union Asbestos & Rubber Co., Chicago, Ill.
116,002. The word RECORD—rubber tires. Mead Cycle Co., Chicago, Ill.
117,730. Representation of the vessel *Mayflower*—rubber soles and heels. Mayflower Rubber Works Co., Braintree, Mass.
119,455. The word NITREX—varnish for coloring and coating the surface of rubber tires. The Sterling Varnish Co., Pittsburgh, Pa.
119,605. The words SEA SAFE and the representation of an anchor—waterproof bags and purses. Theodore Hutnikow, Brooklyn, N. Y.
120,296. The word CIRCOMAT—rubber mats and mattings. United States Tire Co., New Brunswick, N. J., and New York City.
120,732. The word TITAN—rubber footwear, etc. Apsley Rubber Co., Hudson, Mass.
120,734. The word CLIMAX—rubber footwear, etc. Apsley Rubber Co., Hudson, Mass.
120,842. The word OMO—gum tissue. The Omo Manufacturing Co., Middletown, Conn.
120,843. The word OMO, having a pair of wings spreading upward from the top points of the letter M—gum tissue. The Omo Manufacturing Co., Middletown, Conn.
121,677. The words PHIL CO—rubber separators or retainers for battery plates—Philadelphia Storage Battery Co., Philadelphia, Pa.

THE DOMINION OF CANADA.

25,234. Representation of seven baby heads on a ring—rubber nipples. United Drug Co., Limited, Toronto, Ont.
25,235. Representation of a druggist's mortar and pestle attached to a bar—hot-water bottles, fountain syringes, etc. United Drug Co., Limited, Toronto, Ont.
25,278. Representation of an Indian's head within a circle—vulcanized fiber. American Vulcanized Fibre Co., Wilmington, Del., U. S. A.
25,279. The words VUL-COT—vulcanized fiber. American Vulcanized Fiber Co., Wilmington, Del., U. S. A.
25,308. The word SCULPTE—hollow and solid rubber tires, tire covers, and casings, all provided with anti-skidding rubber ribs. Société Generale des Etablissements Bergougnan, Clermont-Ferrand, Puy-de-Dôme, France.

25,309. Representation of a porcupine with a ribbon above bearing the words PORCUPINE BOOT—automobile tire patches, inner liners, and reinforcements. Edgar M. Steell, Spokane, Wash., U. S. A.

NEW ZEALAND.

To Americans.

14,773. The word Tycos—theremometers, gages, and other measuring devices. Taylor Instrument Cos., 95 Ames street, Rochester, N. Y., U. S. A.

14,780. The word Usco—all mechanical rubber goods in Class 40, including tubing other than tires, belting, hose, rings, washers, packings, springs, cushions, stoppers, sheetings, bumpers, thread, tape, mats, valve-disks, rubber heels unattached, sheet tiling, and dredging sleeves. United States Rubber Co., 1790 Broadway, New York City, U. S. A.

15,157. The words AMAZON SPIRAL PACKING and the representation of an Amazon native sitting on an enlarged spiral piece of packing—rubber packing. United States Rubber Co., 1790 Broadway, New York City, U. S. A.

15,526. Representation of cross-section of tire surrounding smiling face of automobilist with goggles on forehead, all above the word LEE—tires, inner tubes, valve patches, inner cases, hose, belting, etc. Lee Tire & Rubber Co., 245 West 55th street, New York City, U. S. A.

15,654. The word STAR in white-outlined black letters against a black star—pneumatic and solid tires, tire patches, liners, and retread bands. The Star Rubber Co., 1025 Sweitzer avenue, Akron, O., U. S. A.

15,707. The word FIRESTONE—boots, shoes, overshoes, hats, coats, etc., of rubber or material containing rubber. The Firestone Tire & Rubber Co., Akron, O., U. S. A.

THE FRENCH REPUBLIC.

To Americans.

26,526. The words ADAMS' CALIFORNIA FRUIT and the representation of different kinds of fruit—chewing gum, etc. American Chicle Co., New York City, U. S. A.

26,527. The words ADAMS BLACK JACK—chewing gum, etc. American Chicle Co., New York City, U. S. A.

26,528. The words ADAMS PEPSIN—chewing gum, etc. American Chicle Co., New York City, U. S. A.

AUSTRALIA.

To Americans.

24,006. The word CAMACHINE—machines for slitting, winding, cutting, and perforating flexible materials; also parts and accessories. Cameron Machine Co., 61 Poplar street, Brooklyn, N. Y., U. S. A. (W. J. Spruson, Daily Telegraph Buildings, King street, Sydney.)

24,513. Representation of a woman's head above the word OMO having a pair of wings spreading upward from the top points of the letter M—dress shields of rubber or gutta percha alone or in combination but predominating. The Omo Manufacturing Co., Middletown, Conn., U. S. A. (W. J. Spruson, Daily Telegraph Buildings, King street, Sydney.)

DESIGNS.

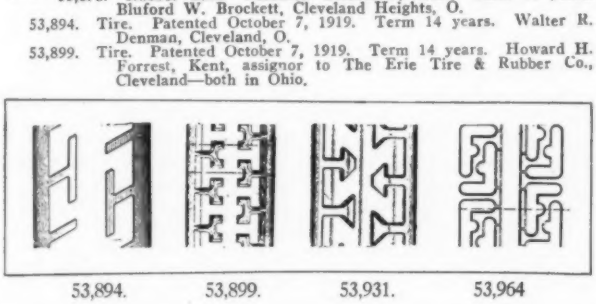
THE UNITED STATES.

NO. 53,877. Rubber heel. Patented October 7, 1919. Term 14 years. Bluford W. Brockett, Cleveland Heights, O.

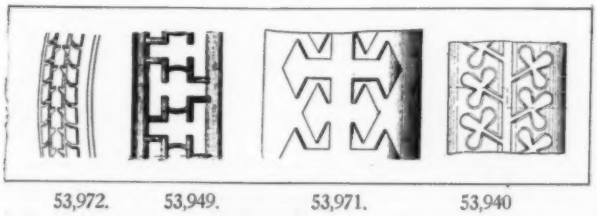
53,878. Rubber heel. Patented October 7, 1919. Term 14 years. Bluford W. Brockett, Cleveland Heights, O.

53,894. Tire. Patented October 7, 1919. Term 14 years. Walter R. Denman, Cleveland, O.

53,899. Tire. Patented October 7, 1919. Term 14 years. Howard H. Forrest, Kent, assignor to The Erie Tire & Rubber Co., Cleveland—both in Ohio.



53,894. 53,899. 53,931. 53,964



53,972. 53,949. 53,971. 53,940

53,931. Tire. Patented October 7, 1919. Term 14 years. Frederick A. Oberheu, Detroit, Mich.

53,940. Tire. Patented October 7, 1919. Term 14 years. Harry J. Smith, Binghamton, N. Y.

53,949. Tire. Patented October 7, 1919. Term 14 years. Edgar A. Tinsman, Akron, assignor to The Standard Tire Co., Willoughby—both in Ohio.

53,964. Tire. Patented October 14, 1919. Term 3½ years. John Flynn, assignor to The Williams Foundry & Machine Co.—both of Akron, O.

53,971. Tire. Patented October 14, 1919. Term 14 years. Arthur E. Pearce, Ashtabula, O.

53,972. Tire. Patented October 14, 1919. Term 14 years. Benjamin H. Pratt, Milwaukee, Wis.

THE DOMINION OF CANADA.

4,640. Rubber mat. Patented August 21, 1919. Dunlop Tire & Rubber Goods Co., Limited, Toronto, Ont.

4,652. Footwear. Patented September 17, 1919. Canadian Consolidated Rubber Co., Limited, Toronto, Ont.

4,653. Footwear. Patented September 17, 1919. Canadian Consolidated Rubber Co., Limited, Toronto, Ont.

4,660. Tire tread. Patented October 20, 1919. The Marathon Tire & Rubber Co., Limited, St. Catherines, Ont.

4,662. A sign. Patented October 20, 1919. Canadian Consolidated Rubber Co., Limited, Montreal, Que.

REGULATIONS GOVERNING FOREIGN TRADE MARKS.

The following is a condensed abstract of the important features of the trade-mark laws of the leading countries of the world. Manufacturers of trade-marked articles should bear in mind that in quite a number of foreign countries ownership of a trade mark is acquired only by registration, not use. Hence, an unauthorized person may register an existing trade mark in these countries, and such registration may prevent the rightful owner from afterwards using it in those countries. The importance of registration of trade marks in foreign countries is therefore evident:

Country	Term. Years.	See Footnotes	Country	Term. Years.	See Footnotes.
Argentina	10	*a c*	Holland	20	*e f*
Australia	14	*c e g*	Honduras	Perpetual	*d f*
Austria	10	*d e f*	Hungary	10	*d e f*
Belgium	Perpetual	*e f*	India	—	*h*
Bolivia	1 or more	*a h*	Italy	Perpetual	*b d e f*
Brazil	15	*d e g*	Japan	20	*e f*
British Honduras	Perpetual	*l*	Luxemburg	10	*f*
Bulgaria	10	*d g*	Mexico	20	*c e g*
Canada—General	Perpetual	*b c*	New Zealand	14	*c e*
Canada—Specific	25	*b c*	Nicaragua	10	*a*
Ceylon	14	*c e*	Norway	10	*a d e*
Chile	10	*a*	Panama	10	*d f*
China	—	*i*	Paraguay	10	*a*
Colombia	20	*f*	Peru	10	*a*
Costa Rica	15	*a*	Portugal	10	*a d e*
Cuba	15	*a d e*	Rumania	15	*f*
Denmark	10	*d e g*	Russia	10	*d g*
D. E. Indies	20	*e f*	Salvador	20	*c g*
Ecuador	20	*b c*	Servia	10	*a d e*
Egypt	—	*b j*	South Africa	14	*c g*
Finland	10	*d f*	Spain	20	*d e g*
France	15	*c e f*	Sweden	10	*a d e*
Germany	10	*a d e*	Switzerland	20	*d e f*
Great Britain	14	*c e g*	Tunis	15	*e f*
Greece	10	*d f*	Turkey	15	*a f*
Guatemala	10	*a d*	Uruguay	10	*c d g*
			Venezuela	30 or less	*a*

NOTES.

(*a*)—Registration alone gives ownership. (*b*)—Ownership acquired by use without registration. (*c*)—Infringers cannot be sued until mark is registered. (*d*)—Foreigners must first register in home country. (*e*)—Under International Convention, citizen of any other Convention country has priority from home application if filed within four months. (*f*)—Registration subject to rights of prior user in such country. (*g*)—Registration is only prima-facie evidence of title to mark but becomes conclusive after expiration of a certain period. (*h*)—BOLIVIA: Registration compulsory. (*i*)—CHINA: Pending the promulgation of more satisfactory regulations, trade marks are being deposited with the Imperial Maritime Customs at Shanghai in order to secure evidence of priority of use. (*j*)—EGYPT: No statute for registering trade marks, but applicant's claim to such is filed in the Court of First Instance of the Mixed Tribunals at Cairo. (*k*)—INDIA: No special trade marks registration act exists in India, but it is customary to register a declaration of ownership of the trade mark, which registration may be adduced as evidence to prove exclusive right to the mark. (*l*)—Protection secured by advertising. (From "An Export Order." (Published by the National Association of Manufacturers, New York City.)

TRADE-MARKS AND NATIONALITY.

A new provision of the British Patent Office requires each applicant for a trade-mark to declare his nationality, or, in the case of firms, that of the individual members. This declaration may be embodied in the application, in which case the applicant must sign the application personally, or, in the case of firms, each individual member must sign and make declaration. If the application is signed by an agent, the declaration may be on the authorization to the agent or on a separate form. In the case of bodies corporate, in connection with those obviously incorporated under the laws of Great Britain, no further information will be required; in all other cases, particulars of incorporation must be inserted in the application, e. g., "a company organized under the laws of France," etc.

Review of the Crude Rubber Market.

NEW YORK.

THE CRUDE RUBBER MARKET during the past month has been largely speculative, trading has been active, and there have been large offerings which were taken up as they came, but manufacturers were not as ready to buy as they were the month before. The market has run up to 54¼ cents for smoked sheets and has been as low as 52, but the prices for the beginning and the end of the month are practically the same; they have been affected somewhat by the drop in exchange. There was some interest in January-June arrivals.

Those in a position to know are skeptical about British estimates of largely increased production of plantation rubber for 1920 and 1921 and expect rather a falling off from the figures for 1919. It is rumored that the planters in the Far East are going to take concerted action to improve their property by tapping the trees only in alternate years.

Prices for plantation and South American rubber at the beginning and toward the close of the month are shown in the following quotations:

PLANTATION *Hevea*. November 1, first latex crêpe, spot 54 cents, November-December 53½ cents, January-March 53½-54 cents, January-June 53½ cents, July-December, 1920, 53½-54 cents. November 20, spot 53 cents, futures 53½.

November 1, ribbed smoked sheets, spot 53 cents, November-December 52½ cents, January-March 53 cents, January-June 52½-53 cents, July-December, 1920, 52½-53 cents, November 20, spot 52 cents, futures 52¼ cents, July-December, 1920, 52½ cents.

NOVEMBER 1, No. 1 amber crêpe, spot 51 cents, futures 50 cents. NOVEMBER 20, spot 50½ cents.

NOVEMBER 1, clear thin brown crêpe, spot 46-47 cents, January-June 47-48 cents. NOVEMBER 20, spot 48 cents.

NOVEMBER 1, No. 1 roll brown crêpe, spot 40-41 cents, futures 39-41 cents. NOVEMBER 20, spot 47½ cents, futures 41 cents.

SOUTH AMERICAN PARAS AND CAUCHO. NOVEMBER 1, spot prices: upriver fine 52½-53½ cents, islands fine 49-50 cents, upriver coarse 34-35 cents, islands coarse 22-25 cents, Cametá coarse 22-23 cents, caucho ball 34½-35 cents. NOVEMBER 20, spot prices: upriver fine 52 cents, islands fine 48 cents, upriver coarse 34¼ cents, islands coarse 22-23 cents, Cametá coarse 24-25 cents, caucho ball 35 cents.

NEW YORK QUOTATIONS.

Following are the New York spot quotations, for one year ago, one month ago and on November 25, the current date:

	December 1, 1918. Free Rubber.	November 1, 1919.	November 25, 1919.
PLANTATION HEVEA—			
First latex crêpe	61½@	53 @	52¼@
Amber crêpe No. 1	57 @	49 @	51 @
Amber crêpe No. 2	56 @	48 @	50 @
Amber crêpe No. 3	55 @	47 @	49 @
Amber crêpe No. 4	54 @	46 @	47 @
Brown crêpe, thick and thin clean	53 @	44 @	47 @
Brown crêpe, thin specky	49 @	41½@	45 @
Brown crêpe, rolled	43 @	40½@	43½@
Smoked sheet, ribbed, standard quality	60½@	52 @	57¾@
Smoked sheets, plain, standard quality	@	49 @	54 @
Unsmoked sheet, standard quality	@	47 @	52 @
Colombo scrap No. 1	@	35 @	35 @
Colombo scrap No. 2	@	34 @	34 @
EAST INDIAN—			
Assam crêpe	@	48 @	49 @
Assam onions	@	@	47 @
Penang block scrap	@	@	@
PONTIANAK—			
Banjermassin	@	11 @12	11½@14
Palembang	@	12¾@	13 @
Pressed block	@	22½@	24 @27
Sarawak	@	09¾@	11 @

	December 1, 1918. Free Rubber.	November 1, 1919.	November 25, 1919.
SOUTH AMERICAN—			
PARAS—			
Upriver fine	64 @67	52½@53	50 @
Upriver medium	@	50 @	@
Upriver coarse	38 @39	34½@	34½@35
Upriver weak, fine	52 @	41 @	40 @
Islands, fine	@	47½@48	47½@48
Islands, medium	@	45 @	47 @48
Islands, coarse	27 @	21½@	22 @23
Cametá, coarse	27 @	23 @	23 @24
Madeira, fine	@	53½@	51 @51½
Acre Bolivian, fine	@	53½@	51 @51½
Peruvian fine	@	51 @	51 @51½
Tapajos fine	@	50 @	50 @
CAUCHO—			
Lower caucho ball	@	31 @	32 @34
Upper caucho ball	38 @39	35½@	34 @35
MANICOBAS—			
Ceara negro heads	@	40 @	@
Ceara scrap	@	30 @	@
Maniçoba (30% guarantee)	@	37 @	@
Mangabeira thin sheet	@	40 @	@
CENTRALS—			
Corinto scrap	39 @	34 @34½	34 @34½
Esmeralda sausage	39 @	34 @34½	34 @34½
Central scrap	39 @	34 @34½	33 @34
Central scrap and strip	34 @35	30 @	32 @32½
Central wet sheet	@	24 @24½	22 @23
Guayule (20% shrinkage)	32 @	27 @	28 @
Guayule, dry	35 @	36 @	38 @
AFRICANS—			
Niger flake, prime	28 @	18 @	18 @
Benguela, extra No. 1, 28%	33 @	@	@
Benguela No. 2, 32½%	29 @	26½@	@
Congo prime, black upper	48 @	@	37 @
Congo prime, red upper	@	@	@
Kassai black	@	@	37 @38
Rio Nunez ball	48 @	@	@
Rio Nunez sheets and strings	@	@	42 @
Conakry niggers	@	@	42 @
Massai sheets and strings	@	@	42 @
GUTTA PERCHA—			
Gutta Siak	@	23 @25	25 @
Red Macassar	@	2.60 @2.75	2.85 @
BALATA—			
Block, Ciudad, Bolivar	71 @	57 @60	60 @64
Colombia	60 @	48 @50	53 @55
Panama	58 @	40 @45	43 @45
Surinam sheet	95 @	84 @85	88 @
amber	@	87 @88	90 @

RECLAIMED RUBBER.

THE IMPROVEMENT in the reclaimed rubber market, noted in the report for the month, still continues and prices on all grades are firm with upward tendency. In some lines the mills are unable to meet the demand for stock.

Most manufacturers of mechanical rubber goods are falling behind in deliveries, particularly in the lines of heavy goods, a situation attributable in part to export demand and in part to renewal and increase of equipment in domestic manufacturing and railway equipment. Automobile tire manufacturers on all sides are planning increased manufacturing facilities. The outlook is decidedly optimistic for the reclaimers.

NEW YORK QUOTATIONS.

NOVEMBER 25, 1919.

Subject to change without notice.

Standard reclaims:			
Floating	lb.	.30 @	.35
Friction	lb.	.25 @	.35
Mechanical	lb.	.11 @	.16
Red	lb.	.20 @	.25
Shoe	lb.	.15 @	.15¾
Tires, auto	lb.	.15 @	.16½
truck	lb.	.11½@	.12½
White	lb.	.22 @	.25

COMPARATIVE HIGH AND LOW SPOT RUBBER PRICES.

October.

	Allocated and Free.					
	1919.		1918.		1917.	
PLANTATIONS:						
First latex crêpe	$0.53½ @	$0.49¼	$0.62 @	$0.37	$0.65 @	$0.62½
Smoked sheet ribbed	.52½ @	.48½	.61 @	.35	.64 @	.61
PARAS:						
Upriver, fine	.55 @	.52	.66 @	.56	.66½ @	.63½
Upriver, coarse	.35 @	.33	.36 @	.30	.46 @	.42½
Islands, fine	.48½ @	.48	.59 @	.44	.55 @	.50
Islands, coarse	.23½ @	.22	.38 @	.20	.29 @	.27
Cameta	.23 @	.22	.29 @	.31	.30 @	.28

[1]Figured only to October 25.

THE MARKET FOR COMMERCIAL PAPER.

In regard to the financial situation, Albert B. Beers, broker in crude rubber and commercial paper, No. 68 William street, New York City, advises as follows:

"During November there has been a fair demand for paper, mostly from out-of-town banks, and the best rubber names have been taken at 5¾ to 6 per cent and those not so well known 6¼ to 6½ per cent.

SINGAPORE RUBBER REPORT.

GUTHRIE & CO., LIMITED, Singapore, report [October 16, 1919]:

At the usual weekly auctions held yesterday and to-day there was a strong demand for all grades which continued throughout the sales. Fine pale crêpe realized up to 96 cents (one small lot in bulk sold at 96½ cents and one lot in cases at the same figure) showing an advance on the week of 7 cents. Ribbed smoked sheet was readily taken up at up to 96 cents (two small lots in bulk fetching 96½ cents) showing an advance on last week of 6 cents.

Lower grades showed corresponding advances.

The total quantity catalogd was 940 tons of which 866 tons were offered and 674 tons sold.

The following is the course of values:

	In Singapore, per Pound.[1]			Sterling Equivalent per Pound in London.		
Sheet, fine ribbed smoked	93c	@	96c	2/ 4½	@	2/ 5¾
Sheet, good ribbed smoked	85	@	92½	2/ 2¼	@	2/ 4⅜
Crêpe, fine pale	93½	@	96	2/ 5⅛	@	2/ 5⅞
Crêpe, good pale	86½	@	93	2/ 3⅛	@	2/ 5
Crêpe, fine brown	70	@	74	1/10½	@	1/11⅝
Crêpe, good brown	65	@	67½	1/ 9⅛	@	1/ 9⅞
Crêpe, dark brown	62	@	66½	1/ 8¼	@	1/ 9½
Crêpe, bark brown	59	@	60	1/ 7⅝	@	1/ 7¾

[1]Quoted in S. S. Currency—$1 = $0.567.

BATAVIA RUBBER MARKET.

HERMANS, MARSMAN & CO., Batavia, report [August 15-September 18, 1919]:

The market opened rather quiet and prices advanced until 1.21 guilders [48.4 cents] for the 100 per cent first crêpe and 1.19 guilders [47.6 cents] for the smoked sheets. Suddenly a very strong demand came up which caused a heavy advance of prices for all grades. The highest price paid for the 100 per cent first crêpe was about 1.45 guilders [58 cents], with one cent lower for the smoked sheets. These prices could only maintain for some days and they soon increased again. The market closed with the following quotations:

	In Batavia Per ½-kilo.[1] Guilders.	Equivalent Per ½-kilo in U. S. Currency.
Fine pale crêpe	1.35	$0.54
First pale crêpe	1.33	.532
First pale crêpe, basis 75 per cent	1.25	.50
Prime smoked sheets	1.31	.524
Prime smoked sheets, basis 75 per cent	1.23	.496

[1] Quoted per ½-kilo (1.1 pounds) in Dutch Indian guilders ($0.40).

PLANTATION RUBBER EXPORTS FROM JAVA.*

	August.		Eight Months Ended August 31.	
	1918.	1919.	1918.	1919.
To Holland ...kilos	.....	567,000	.....	981,000
England	.....	177,000	1,659,000	4,781,000
France	.....	.....	.....	176,000
United States	213,000	1,013,000	4,454,000	11,578,000
Singapore	667,000	494,000	5,874,000	3,580,000
Japan	22,000	.....	656,000	179,000
Australia	303,000	76,000	354,000	245,000
Other countries	83,000	.....	393,000	33,000
Totals	1,287,000	2,327,000	13,390,000	21,553,000
Ports of origin:				
Tandjong Priok	969,000	1,584,000	7,182,000	11,700,000
Cheribon	.....	10,000	.....	10,000
Semarang	9,000	28,000	124,000	345,000
Soerabaya	309,000	682,000	6,085,000	8,751,000
Probolinggo	.....	24,000	.....	24,000
Tjilatjap	.....	.....	.....	149,000
Totals	1,287,000	2,328,000	13,391,000	20,979,000

* Not verified.

FEDERATED MALAY STATES RUBBER EXPORTS.

An official report from Kuala Lumpur states that the September exports of rubber from the Federated Malay States amounted to 9,841 tons compared with 10,626 tons in August and 6,588 tons in the corresponding month last year. For nine months of the present year the exports amounted to 79,824 tons against 58,142 tons in 1918 and 58,848 tons in 1917. Appended are the comparative statistics:

	1917.	1918.	1919.
January ...tons	5,995	7,588	7,163
February	7,250	6,820	10,809
March	7,088	7,709	10,679
April	5,955	7,428	7,664
May	7,179	5,851	7,308
June	6,009	5,161	7,094
July	5,798	5,706	8,640
August	6,487	5,291	10,626
September	7,087	6,588	9,841
Totals	58,848	58,142	79,824

STRAITS SETTLEMENTS RUBBER EXPORTS.

An official report from Singapore states that the export of plantation rubber from Straits Settlements ports in the month of September amounted to 10,476 tons (of which 2,140 tons were transhipments), compared with 8,933 tons in August and 6,209 tons in the corresponding month last year. The total exports for nine months of the present year amounted to 109,952 tons, compared with 51,616 tons in 1918 and 56,332 tons for the corresponding period in 1917. Appended are the comparative statistics:

	1917.	1918.	1919.
January ...tons	3,562	4,302	14,404
February	6,495	2,334	15,661
March	8,299	8,858	20,908
April	6,103	6,584	10,848
May	6,282	13,587	15,845
June	8,775	6,515	5,059
July	7,351	1,978	7,818
August	3,786	1,249	8,933
September	5,679	6,209	10,476
Totals	56,332	51,616	109,952

RUBBER IMPORTS AND EXPORTS FOR CEYLON.

IMPORTS.

	January 1 to October 6.	
	1918.	1919.
Crude rubber:		
From Straits Settlements ...pounds	1,996,633	2,088,102
India	2,479,076	1,099,924
Burma and other countries	3,107	.....
Totals	4,478,816	3,187,526

EXPORTS.

Crude rubber:		
To United Kingdom ...pounds	15,260,973	20,690,277
Belgium	.....	29,120
France	471,735	383,400
[1]Victoria	513,119	98,755
[1]New South Wales	319,491	154,212
United States	13,588,545	44,539,523
Canada and Newfoundland	5,386,995	668,294
Africa	2,294	.....
India	2,459	2,313
Straits Settlements	.....	454
Japan	206,058	213,506
Totals	35,751,669	66,779,854

[1]These figures include cargoes for transshipment to New Zealand, other ports of Australia, and dependencies.

(Compiled by the Ceylon Chamber of Commerce.)

ANTWERP RUBBER ARRIVALS.

OCTOBER 30.	By the steamer *Anversville* from the Congo.	
Bungé & Co.	(Comptoir Commercial Congolais) ...kilos	11,640
Bungé & Co.	(Belgika)	2,500
Bungé & Co.	(Grands Lacs)	9,300
Bungé & Co.	(Campagnie du Kassai)	28,000
Bungé & Co.	(Forminière)	6,100
Bungé & Co.		39,000
Société Coloniale Anversoise	(Chemin de Fer du Haut Congo)	10,240
Others		62,600
Total	...kilos	169,380

EXPORTS OF INDIA RUBBER FROM MANAOS DURING THE MONTH OF SEPTEMBER, 1919.

	New York.					Europe.					Grand
EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	TOTALS.
Tancredo, Porto & Co ...kilos	91,055	12,604	11,796	64,545	180,000	70,000	.....	.....	.....	70,000	250,000
J. A. Mendes & Co	78,355	4,637	10,438	144,160	237,590	.....	.....	.....	.....	.....	237,590
General Rubber Co. of Brazil	137,427	11,399	17,128	41,046	207,000	.....	.....	.....	.....	.....	207,000
Stowell & Co	121,000	5,523	11,422	9,470	147,415	.....	.....	2,573	.....	2,573	149,988
Ohliger & Co	31,875	10,540	2,819	50,133	95,367	.....	.....	.....	.....	.....	95,367
Semper & Co	10,240	.....	.....	.....	10,240	.....	.....	.....	.....	.....	10,240
Adelbert H. Alden, Limited	.....	.....	.....	.....	.....	3,570	.....	.....	.....	3,570	3,570
Totals	469,952	44,703	53,603	309,354	877,612	73,570	.....	2,573	.....	76,143	953,755
From Iquitos	40,684	39,802	2,705	5,550	88,741	26,676	11,969	7,032	11,621	57,298	146,039
Totals	510,636	84,505	56,308	314,904	966,353	100,246	11,969	9,605	11,621	133,441	1,099,794

(Compiled by Stowell & Co., Manaos, Brazil.)

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS.

PARAS AND CAUCHO AT NEW YORK.

	Fine.	Medium.	Coarse.	Caucho.	Mixed.	Totals. Pounds.
OCTOBER 23. By the S. S. *Gregory*, from Pará, Manáos and Iquitos.						
†Meyer & Brown	61,600§	.....	7,400	1,500	.....	70,500
†H. A. Astlett & Co.	287,500§	.....	36,000	401,100	.....	724,500
†G. Amsinck & Co., Inc.	53,128	8,712	12,762	80,434	.....	155,036
†Poel & Kelly	325,634	29,607	38,619	28,560	.....	422,420
†Fred Stern & Co.	.....	.....	6,854	4,113	.....	10,967
Gaston, Williams & Wigmore	.....	28	.....	.....	.....	10,296
Paul Bertuch	1,148	2,230	206,622	209,658	.....	419,658
William H. Schall & Co.	.....	.....	.....	14,000	.....	14,000
Rubber Association of America, Inc.	182	157	.....	.....	.....	136,182
Ultramares Corp.	32	1	.....	94	.....	45,430
General Rubber Co.	.....	.....	57	.....	.....	14,000
Various	.....	.....	.....	.....	.....	2,033,973
NOVEMBER 3. By the S. S. *Newton*, from Pará.						
†H. A. Astlett	52,600	.....	17,800	.....	.....	70,400
†Poel & Kelly	76,500	4,300	1,700	600	.....	83,100
Gaston, Williams & Wigmore	.....	.....	.....	.....	.....	177,056
G. Amsinck & Co., Inc.	.....	.....	.....	.....	.....	35,712
†Paul Bertuch	48,722	1,873	.....	.....	.....	50,595
Meyer & Brown	.....	.....	.....	.....	.....	1,928
Various	.....	.....	.....	.....	.....	4,928,815
NOVEMBER 8. By the S. S. *St. Michael*, from Pará, Manáos, Iquitos and Ceara.						
†H. A. Aslett & Co.	123,000	.....	56,500	156,500	.....	330,000
†Paul Bertuch	84,758	3,206	43,893	84,656	.....	216,513
†Poel & Kelly	235,190	10,793	8,953	1,401	2,644	258,981
General Rubber Co.	377	28	72	.....	.....	1,882,779
Ultramares Corp.	236	37	26	.....	.....	104,526
†Meyer & Brown, Inc.	83,100§	.....	4,500	20,900	.....	108,500
Gaston, Williams & Wigmore	270	.....	.....	95	.....	157,797
G. Amsinck & Co., Inc.	....	.....	12	.....	.....	3,340
Aldens' Successors, Inc.	.....	3,331	2,834	464	12,777	19,406
F. R. Henderson & Co.	27	2	2	.....	.....	10,480
Winter, Ross & Co.	22	1	9	.....	1	10,113
Cowdrey & Co.	19	.....	.....	.....	.....	6,626
W. R. Grace & Co.	.....	24	4	.....	.....	12,607
Rubber Association of America, Inc.	10	16	6	.....	5	17,415
‡Various	1,381	330	632	256	475	1,109,288
‡Various	135	.....	.....	.....	.....	38,396

†Pounds. ‡From Ceara, bales and cases. ¶Including 38,035 pounds transhipped from Itacoatiara. §Pounds, including medium.

PLANTATIONS.

(Figured 180 pounds net to the bale or case.)

	Shipment from.	Shipped to.	Pounds.	Totals.
OCTOBER 20. By the S. S. *Manhattan*, at New York.				
The Goodyear Tire & Rubber Co.	London	Akron, O.	49,920	
Rubber Trading Co.	London	New York	44,800	
H. F. Winter & Co.	London	New York	28,260	122,980
OCTOBER 20. By the S. S. *Osteric*, at New York.				
F. H. Henderson & Co.	Glasgow	New York	659,838	
Rubber Trading Co.	Glasgow	New York	22,400	
Chas. T. Wilson & Co., Inc.	Glasgow	New York	22,400	
L. Littlejohn & Co., Inc.	Glasgow	New York	224,000	
Meyer & Brown, Inc.	Glasgow	New York	227,400	
Poel & Kelly	Glasgow	New York	183,040	
The Goodyear Tire & Rubber Co.	Glasgow	Akron, O.	111,600	
C. C. Trevanion & Co.	Glasgow	New York	12,600	
Various	Glasgow	New York	50,400	1,513,678
OCTOBER 20. By the S. S. *Empress of Asia*, at Vancouver.				
The Goodyear Tire & Rubber Co.	Singapore	Akron, O.	245,700	
Edward Boustead & Co.	Penang	Akron, O.	144,000	
F. R. Henderson & Co.	Singapore	Seattle	70,920	
F. R. Henderson & Co.	Singapore	New York	37,080	
Adolph Hirsch & Co.	Singapore	New York	44,890	
Meyer & Brown, Inc.	Singapore	Vancouver	33,600	576,190
OCTOBER 21. By the S. S. *Rotterdam*, at New York.				
Aldens' Successors, Inc.	Rotterdam	New York	44,800	
Various	Rotterdam	New York	22,160	66,960
OCTOBER 23. By the S. S. *Francisco*, at New York.				
Various	Hull	New York	6,270	6,270
OCTOBER 23. By the S. S. *Celtic*, at New York.				
Various	Liverpool	New York	25,920	25,920
OCTOBER 23. By the S. S. *Kerman*, at New York.				
The Goodyear Tire & Rubber Co.	Colombo	Akron, O.	344,095	
Meyer & Brown, Inc.	Colombo	New York	280,000	
L. Littlejohn & Co., Inc.	Colombo	New York	705,600	
C. C. Trevanion & Co.	Colombo	Seattle	167,980	
Chas. T. Wilson Co., Inc.	Colombo	New York	91,840	
Poel & Kelly	Colombo	New York	85,530	
Winter, Ross & Co.	Colombo	New York	44,800	
Thornett & Fehr.	Colombo	New York	44,200	1,764,045
OCTOBER 24. By the S. S. *Verbania*, at New York.				
Aldens' Successors, Inc.	London	New York	1,696,447	
Poel & Kelly	London	New York	546,011	
Winter, Ross & Co.	London	New York	1,267,020	
Thornett & Fehr.	London	New York	367,740	
The Goodyear Tire & Rubber Co.	London	Akron, O.	166,140	
East Asiatic Co., Inc.	London	New York	33,480	
Curry, McPhillips & Co.	London	New York	1,131,660	
L. Littlejohn & Co., Inc. Inc.	London	New York	644,936	5,853,434
OCTOBER 25. By the S. S. *Invincible*, at New York.				
L. Littlejohn & Co., Inc.	London	New York	175,620	175,620
OCTOBER 27. By the S. S. *Prometheus*, at New York.				
F. R. Henderson & Co.	Singapore	New York	890,820	
Chas. T. Wilson Co. Inc.	Singapore	New York	201,600	
William H. Stiles & Co.	Singapore	New York	145,600	
Pell & Dumont, Inc.	Singapore	New York	100,800	
Pacific Trading Co. of America	Singapore	New York	71,820	
Aldens' Successors, Inc.	Singapore	New York	335,835	
Firestone Tire & Rubber Co.	Singapore	New York	64,980	
Adolph Hirsch & Co., Inc.	Singapore	New York	44,804	
Raw Products Co.	Singapore	New York	30,240	
J. T. Johnstone & Co., Inc.	Singapore	New York	130,520	
L. Littlejohn & Co., Inc.	Singapore	New York	1,258,000	
Fred Stern & Co.	Singapore	New York	459,000	
Edward Maurer Co., Inc.	Singapore	New York	277,280	
Poel & Kelly	Singapore	New York	197,500	
Meyer & Brown, Inc.	Singapore	New York	246,400	
Thos. A. Desmond & Co.	Singapore	New York	235,260	
East Asiatic Co.	Singapore	New York	226,000	
Gaston, Williams & Wigmore	Singapore	New York	196,920	
Edward Boustead & Co.	Singapore	New York	120,420	
Jaeger & Co., of London.	Singapore	New York	114,540	
Mexican Crude Rubber Co.	Singapore	New York	108,000	
A. C. Harper	Singapore	New York	72,000	
Suzuki & Co.	Singapore	New York	49,500	
Rogers-Pyatt Shellac Co.	Singapore	New York	39,420	
Federal Export Corp.	Singapore	New York	18,360	
W. R. Grace & Co.	Singapore	New York	18,360	
Boston Insulated Wire & Cable Co.	Singapore	Dorchester	3,780	
Stanley, Jordan & Co.	Singapore	New York	360	
Various	Singapore	New York	702,705	6,360,824
OCTOBER 27. By the S. S. *Saugerties*, at New York.				
J. T. Johnstone & Co., Inc.	Penang	New York	325,000	
F. R. Henderson & Co.	Penang	New York	250,020	
Chas. T. Wilson Co., Inc.	Penang	New York	168,000	
General Rubber Co.	Penang	New York	117,000	
Hood Rubber Co.	Penang	Watertown	90,000	
William H. Stiles & Co.	Penang	New York	67,200	
Rubber Trading Co.	Penang	New York	54,000	
L. Littlejohn & Co.	Penang	New York	806,000	
Winter, Ross & Co.	Penang	New York	397,980	
Vernon Metal & Produce Co.	Penang	New York	254,520	
Edward Maurer Co., Inc.	Penang	New York	192,600	
Fred Stern & Co.	Penang	New York	179,200	
East Asiatic Co., Inc.	Penang	New York	173,120	
Rubber Importers' & Dealers' Co., Inc.	Penang	New York	86,040	
Poel & Kelly	Penang	New York	39,960	
The Goodyear Tire & Rubber Co.	Penang	Akron, O.	36,540	
W. R. Grace & Co.	Penang	New York	27,000	
Various	Penang	New York	558,720	3,823,900
OCTOBER 27. By the S. S. *Cedric*, at New York.				
Poel & Kelly	Liverpool	New York	34,641	
L. Littlejohn & Co., Inc.	Liverpool	New York	22,400	
Various	Liverpool	New York	7,740	64,781
OCTOBER 28. By the S. S. *Orduna*, at New York.				
Rubber Importers' & Dealers' Co., Inc.	Liverpool	New York	154,440	
L. Littlejohn & Co., Inc.	Liverpool	New York	141,107	
The B. F. Goodrich Co.	Liverpool	Akron, O.	92,520	
Thos. A. Desmond & Co.	Liverpool	New York	61,200	
Edward Maurer & Co., Inc.	Liverpool	New York	33,120	
Poel & Kelly	Liverpool	New York	19,800	
Meyer & Brown, Inc.	Liverpool	New York	11,300	513,487
OCTOBER 29. By the S. S. *Diablo*, at San Francisco.				
J. T. Johnstone & Co., Inc.	Singapore	San Francisco	74,500	
Fred Stern & Co.	Singapore	San Francisco	33,600	108,100
OCTOBER 29. By the S. S. *Rotti*, at New York.				
Winter, Ross & Co.	T'jong Priok	New York	169,920	
Peninsular Trading Agency	T'jong Priok	New York	157,320	
L. Littlejohn & Co., Inc.	Batavia	New York	78,400	
Poel & Kelly	Batavia	New York	57,263	
General Rubber Co.	T'jong Priok	New York	45,000	
Catz American Co.	Batavia	New York	180	
Various	Batavia	New York	41,660	549,743
NOVEMBER 3. By the S. S. *Henry Clay*, at New York.				
Thornett & Fehr.	London	New York	133,560	
Rubber Trading Co.	London	New York	20,700	
L. Littlejohn & Co., Inc.	London	New York	2,196	
Various	London	New York	110,160	266,616
NOVEMBER 3. By the S. S. *Caronia*, at New York.				
L. Littlejohn Co., Inc.	Liverpool	New York	109,560	
Various	Liverpool	New York	46,140	155,700
NOVEMBER 5. By the S. S. *Nieuw Amsterdam*.				
Meyer & Brown, Inc.	Rotterdam	New York	220,800	
Various	Rotterdam	New York	245,530	466,330
NOVEMBER 5. By the S. S. *Lapland*, at New York.				
The Goodyear Tire & Rubber Co.	S'thampton	Akron, O.	161,280	161,280

[1]One case shortshipped on S. S. *Karimoen*.

	Shipment from.	Shipped to.	Pounds.	Totals.
NOVEMBER 6. By the S. S. *Roma*, at New York.				
L. Littlejohn & Co., Inc.	Marseilles	New York	11,200	11,200
No date. By the S. S. *Benghalis*, at San Francisco.				
J. T. Johnstone & Co., Inc.	Batavia	San Fran.	70,500	70,500
NOVEMBER 6. By the S. S. *Ixion*, at Seattle, Washington.				
The B. F. Goodrich Co..	Singapore	Akron, O.	767,880	
The B. F. Goodrich Co..	Penang	Akron, O.	229,860	
Raw Products Co.	Singapore	New York	187,200	
Firestone Tire & Rubber Co.	Penang	Akron, O.	137,340	
J. T. Johnstone & Co.	Singapore	San Fran.	75,650	
[1] General Rubber Co.	Singapore	New York	23,940	
William H. Stiles & Co..	Singapore	New York	19,340	
L. Littlejohn & Co., Inc.	Singapore	New York	860,040	
Fred Stern & Co.	Singapore	New York	560,000	
Rubber Importers' & Dealers' Co., Inc.	Singapore	New York	379,620	
Hadden & Co.	Singapore	New York	213,660	
Thomas A. Desmond & Co.	Singapore	New York	189,000	
Independent Rubber Co., Limited	Singapore	Merriton, Ont.	38,800	
East Asiatic Co.	Singapore	New York	27,000	
The Goodyear Tire & Rubber Goods Co., Ltd.	Singapore	Toronto	10,080	3,719,410
[1] Shortshipped in S. S. *Tyndareus*.				
NOVEMBER 7. By the S. S. *Andoca Luckenbach*, at New York.				
Meyer & Brown, Inc.	Rotterdam	New York	44,100	44,100
NOVEMBER 7. By the S. S. *Mississippi*, at New York.				
L. Littlejohn & Co., Inc..	London	New York	200,822	
Rubber Trading Co.	London	New York	61,920	262,742
NOVEMBER 10. By the S. S. *Navarino*, at New York.				
The B. F. Goodrich Co..	Glasgow	Akron, O.	1,003,140	
Poel & Kelly.	Glasgow	New York	71,227	
L. Littlejohn & Co., Inc.	Glasgow	New York	69,400	
Various	Glasgow	New York	2,237,200	3,380,967
NOVEMBER 10. By the S. S. *Aledo*, at New York.				
Curry, McPhillips & Co..	Antwerp	New York	13,320	13,320
NOVEMBER 10. By the S. S. *Carmania*, at New York.				
Poel & Kelly.	Liverpool	New York	171,241	
The B. F. Goodrich Co..	Liverpool	New York	103,500	
General Rubber Co.	Liverpool	New York	27,720	
Rubber Trading Co.	Liverpool	New York	19,080	
Various	Liverpool	New York	32,940	354,481
NOVEMBER 10. By the S. S. *Baltic*, at New York.				
The Goodyear Tire & Rubber Co.	Liverpool	Akron, O.	55,260	
Thos. A. Desmond & Co.	Liverpool	New York	35,640	90,900
NOVEMBER 10. By the S. S. *Aledo*, at New York.				
Curry, McPhillips & Co.	Antwerp	New York	13,320	13,320
NOVEMBER 11. By the S. S. *Santa Cruz*, at San Francisco.				
Fred Stern & Co.	Singapore	San Fran.	145,000	
J. T. Johnstone & Co., Inc.	Singapore	San Fran.	73,920	218,920
NOVEMBER 11. By the S. S. *Eglantier*, at New York.				
Various	Antwerp	New York	46,620	46,620
NOVEMBER 11. By the S. S. *Luxpalite*, at New York.				
Poel & Kelly.	Marseilles	New York	44,627	
Various	Marseilles	New York	131,413	176,040
NOVEMBER 12. By the S. S. *Siberian Prince*, at New York.				
Various	Havre	New York	4,500	4,500
NOVEMBER 14. By the S. S. *Vasconia*, at New York.				
General Rubber Co.	London	New York	616,860	
T. D. Downing & Co.	London	New York	155,880	
Poel & Kelly.	London	New York	147,960	
Various	London	New York	845,640	1,763,340
NOVEMBER 14. By the S. S. *Romeo*, at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	134,400	
Volkart Bros.	Colombo	New York	130,680	
Meyer & Brown, Inc.	Colombo	New York	112,000	
General Rubber Co.	Colombo	New York	90,000	
Chas. T. Wilson Co., Inc.	Colombo	New York	20,160	
The Goodyear Tire & Rubber Co.	Colombo	Akron, O.	19,840	
Various	Colombo	New York	6,280	513,360
NOVEMBER 15. By the S. S. *Tumeric*, at New York.				
The Goodyear Tire & Rubber Co.	Colombo	Akron, O.	45,720	
C. C. Trevanion & Co.	Colombo	New York	45,360	
Edward Maurer Co., Inc.	Colombo	New York	360	91,440
NOVEMBER 15. By the S. S. *Bawean*, at New York.				
General Rubber Co.	T'jong Priok	New York	126,000	
J. T. Johnstone & Co., Inc.	Soerabaya	New York	105,560	
J. T. Johnstone & Co., Inc.	T'jong Priok	New York	33,120	
T. R. Henderson.	Batavia	New York	59,580	
Aldens' Successors, Inc.	Soerabaya	New York	21,984	
Pablo Homs	Batavia	New York	869,060	
Pablo Homs	T'jong Priok	New York	18,360	
Poel & Kelly.	Batavia	New York	224,000	
L. Littlejohn & Co., Inc.	Singapore	New York	122,622	
The Goodyear Tire & Rubber Co.	Batavia	Akron, O.	101,860	
The Goodyear Tire & Rubber Co.	T'jong Priok	Akron, O.	15,480	
Joosten & Janssen.	T'jong Priok	New York	91,980	
L. Sutro & Co.	T'jong Priok	New York	64,700	
L. Sutro & Co.	Batavia	New York	28,980	
Meyer & Brown, Inc.	Batavia	New York	40,300	
Vernon Metal & Produce Co.	T'jong Priok	New York	22,060	
G. Amsinck & Co., Inc..	T'jong Priok	New York	18,840	
Various	Batavia	New York	283,014	
Various	T'jong Priok	New York	110,160	
Various	Penang	New York	13,680	2,371,340
NOVEMBER 17. By the S. S. *Tumeric*, at New York.				
T. R. Henderson & Co..	Colombo	New York	45,000	
Chas. T. Wilson & Co., Inc.	Colombo	New York	42,840	
L. Littlejohn & Co., Inc.	Colombo	New York	448,000	
The Goodyear Tire & Rubber Co.	Colombo	Akron, O.	190,800	
C. C. Trevanion & Co.	Colombo	New York	176,400	
Meyer & Brown, Inc.	Colombo	New York	100,000	
Poel & Kelly.	Colombo	New York	79,920	1,082,960
NOVEMBER 18. By the S. S. *Empress of Russia*, via Hongkong, at Vancouver.				
General Rubber Co.	Singapore	New York	534,960	
Edward Boustead & Co..	Penang	New York	144,000	
The Goodyear Tire & Rubber Co.	Singapore	Akron, O.	127,980	
Thornett & Fehr.	Batavia	New York	19,800	
L. Sutro & Co.	Batavia	New York	14,940	841,680
NOVEMBER 18. By the S. S. *Eurypylus*, at New York.				
F. R. Henderson & Co..	Singapore	New York	1,662,560	
J. T. Johnstone & Co., Inc.	Medan	New York	610,000	
Chas. T. Wilson Co., Inc.	Singapore	New York	241,380	
Pacific Trading Corp. of America	Singapore	New York	201,600	
William H. Stiles & Co.	Singapore	New York	190,400	
The Fisk Rubber Co.	Singapore	Chicopee Falls	90,000	
Rubber Trading Co.	Singapore	New York	72,000	
Aldens' Successors, Inc.	Singapore	New York	47,000	
Hood Rubber Co.	Singapore	Watertown	44,800	
L. Littlejohn & Co., Inc.	Singapore	New York	1,498,625	
The Goodyear Tire & Rubber Co.	Singapore	Akron, O.	1,107,720	
Rubber Importers' & Dealers' Co., Inc.	Singapore	New York	790,920	
Fred Stern & Co.	Singapore	New York	257,000	
Meyer & Brown, Inc.	Singapore	New York	224,000	
Robertson, Cole & Co..	Singapore	New York	188,280	
Edward Maurer Co., Inc.	Singapore	New York	141,480	
Mitsui & Co., Limited.	Singapore	New York	100,260	
Gaston, Williams & Wigmore	Singapore	New York	89,280	
Stephano Berizzi & Co..	Singapore	New York	40,320	
Rubber Association of America	Singapore	New York	36,000	
East Asiatic Co.	Singapore	New York	32,040	
Joosten & Janssen.	Singapore	New York	27,000	
W. R. Grace & Co.	Singapore	New York	27,000	
Mexican Crude Rubber Co.	Singapore	Detroit	23,440	
Federal Export Corp.	Singapore	New York	18,300	
Jaeger & Co., Limited.	Singapore	New York	10,080	
Poel & Kelly.	Singapore	New York	5,580	
Winter, Ross & Co.	Singapore	New York	540	
Various	Singapore	New York	1,636,380	9,414,645
NOVEMBER 18. By the S. S. *Waaldyk*, at New York.				
General Rubber Co.	Batavia	New York	875,520	
The Fisk Rubber Co.	Batavia	Chicopee Falls	148,500	
J. T. Johnstone & Co., Inc.	Batavia	New York	103,488	
Manhattan Rubber Mfg. Co., Inc.	Batavia	New York	56,160	
Pennsylvania Rubber Co.	Batavia	Jeanette, Pa.	18,720	
L. Littlejohn & Co., Inc.	Soerabaya	New York	224,000	
The Goodyear Tire & Rubber Co.	Batavia	Akron, O.	175,860	
The Goodyear Tire & Rubber Co.	Soerabaya	Akron, O.	125,280	
Rutger Bleecker	Soerabaya	New York	64,440	
Rutger Bleecker	Batavia	New York	54,720	
United Malaysian Rubber Co., Ltd.	Soerabaya	New York	27,400	
Bolle-Watson Co., Inc..	Soerabaya	New York	22,500	
Java-Holland Am. Trading Co.	Soerabaya	New York	15,120	
Rubber Association of America	Soerabaya	New York	9,720	
Various	Batavia	New York	142,080	2,063,508
NOVEMBER 19. By the S. S. *Protesilaus*, at Seattle.				
Fred Stern & Co.	Singapore	Seattle	166,000	166,000
NOVEMBER 20. By the S. S. *Minnekahda*, at New York.				
Rubber Trading Co.	London	New York	29,880	
L. Littlejohn & Co., Inc.	London	New York	104,620	134,500
NOVEMBER 20. By the S. S. *City of Manila*, at New York.				
Meyer & Brown, Inc.	Colombo	New York	224,000	
Poel & Kelly.	Colombo	New York	95,340	
Pacific Trading Corp. of America	Colombo	New York	94,680	
Aldens' Successors, Inc..	Colombo	New York	33,600	447,620

AFRICANS.

	Shipment from.	Shipped to.	Pounds.	Totals.
OCTOBER 20. By the S. S. *Patria*, at New York.				
Rubber Importers' & Dealers' Co., Inc.	Marseilles	New York	15,295	
Various	Marseilles	New York	5,520	20,815
OCTOBER 20. By the S. S. *Chicago*, at New York.				
Various	Bordeaux	New York	320,350	320,350

CENTRALS.

NOVEMBER 6. By the S. S. *Cheropee*, at New York.				
Andean Trading Co.	Cartagena	New York	20,000	20,000
NOVEMBER 10. By the S. S. *Gen. G. W. Goethals*, at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	11,700	
De Lima, Correa & Cortissoz, Inc.	Cristobal	New York	10,800	
J. S. Sembrada & Co.	Cristobal	New York	10,000	
H. A. Ashlett & Co.	Cristobal	New York	8,000	
Neuss, Hesslein & Co.	Cristobal	New York	6,000	
A. H. Capen's Sons, Inc.	Cristobal	New York	3,600	
L. Tuyn	Cristobal	New York	3,200	53,300
NOVEMBER 10. By the S. S. *Vindal*, at New York.				
American Trading Co.	Cartagena	New York	9,500	9,500

MANICOBAS.

OCTOBER 21. By the S. S. *Osage*, at New York.				
Adolph Hirsch & Co., Inc.	Bahia	New York	21,958	21,958

PONTIANAK.

OCTOBER 27. By the S. S. *Prometheus*, at New York.				
United Malaysian Rubber Co., Ltd.	Singapore	New York	670,655	
Meyer & Brown, Inc.	Singapore	New York	130,500	
Kidder, Peabody & Co.	Singapore	New York	108,300	
L. Littlejohn & Co., Inc.	Singapore	New York	60,000	
East Asiatic Co., Inc.	Singapore	New York	17,700	
Various	Singapore	New York	105,000	1,092,155
NOVEMBER 6. By the S. S. *Ixion*, at Seattle.				
Hadden & Co.	Singapore	New York	68,760	
Stephano Berizzi & Co.	Singapore	New York	48,000	116,760
NOVEMBER 15. By the S. S. *Bawean*, at New York.				
United Malaysian Rubber Co., Ltd.	B'j'rmassin	New York	25,770	25,770
NOVEMBER 18. By the S. S. *Eurypylus*, at New York.				
United Malaysian Rubber Co., Ltd.	Singapore	New York	508,913	
L. Littlejohn & Co., Inc.	Singapore	New York	393,000	
Stephano Berizzi & Co.	Singapore	New York	72,000	
Various	Singapore	New York	192,900	1,166,813
NOVEMBER 18. By the S. S. *Waaldyk*, at New York.				
E. Everett Carleton & Co.	Batavia	New York	41,400	41,400

BALATA.

OCTOBER 21. By the S. S. *Maravul*, at New York.				
[a] Southern Sales Corp.	Trinidad	New York	24,390	
G. Amsinck & Co., Inc.	Trinidad	New York	13,950	
Various	Trinidad	New York	1,350	39,690

[a] Including 11,040 pounds block balata.

OCTOBER 23. By the *Prins der Nederlanden*, at New York.				
Arkell & Douglass, Inc.	Cape Haitien	New York	6,393	
Middleton & Co.	Cape Haitien	New York	771	7,164
OCTOBER 24. By the S. S. *Panama*, at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	25,075	
South & Central American Commercial Co.	Cristobal	New York	8,075	
Various	Cristobal	New York	4,675	37,825
OCTOBER 27. By the S. S. *Venus*, at New York.				
Middleton & Co.	Caracas	New York	42,845	
William Schall & Co.	Caracas	New York	9,000	51,845
NOVEMBER 6. By the S. S. *Cheropee*, at New York.				
Antonio Puerto	Cartagena	New York	2,100	
Enrique Ujueta	Cartagena	New York	1,500	3,600
NOVEMBER 10. By the S. S. *Gen. G. W. Goethals*, at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	2,250	
Various	Cristobal	New York	4,100	6,350
NOVEMBER 10. By the S. S. *Baltic*, at New York.				
Fred Stern & Co.	Liverpool	New York	4,509	4,509
NOVEMBER 10. By the S. S. *Vindal*, at New York.				
G. Amsinck & Co., Inc.	Cartagena	New York	17,250	17,250
NOVEMBER 17. By the S. S. *Matura*, at New York.				
Southern Sales Corp.	Trinidad	New York	33,840	
G. Amsinck & Co., Inc.	Trinidad	New York	13,200	
South & Central American Commercial Co.	Trinidad	New York	1,950	
Various	Trinidad	New York	840	49,830

GUTTA PERCHA.

OCTOBER 27. By the S. S. *Prometheus*, at New York.				
United Malaysian Rubber Co., Ltd.	Singapore	New York	33,590	33,590
NOVEMBER 15. By the S. S. *Bawean*, at New York.				
L. Littlejohn & Co., Inc.	Batavia	New York	600	
United Malaysian Rubber Co., Ltd.	B'j'rmassin	New York	125,908	126,508
NOVEMBER 18. By the S. S. *Eurypylus*, at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	87,900	
United Malaysian Rubber Co., Ltd.	Singapore	New York	46,171	
Various	Singapore	New York	6,300	140,371
NOVEMBER 18. By the S. S. *Waaldyk*, at New York.				
United Malaysian Rubber Co., Ltd.	B'j'rmassin	New York	14,196	14,196

GUTTAS.

	Shipment from.	Shipped to.	Pounds.	Totals.
OCTOBER 27. By the S. S. *Prometheus*, at New York.				
Paterson, Simmons & Co.	Singapore	New York	12,900	
Various	Singapore	New York	34,000	46,900
NOVEMBER 18. By the S. S. *Eurypylus*, at New York.				
United Malaysian Rubber Co., Ltd.	Singapore	New York	22,400	22,400

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	September. 1918. Pounds.	1918. Value.	1919. Pounds.	1919. Value.
UNMANUFACTURED—*free:*				
India rubber:				
From France	.....	.....	46,086	$31,576
United Kingdom	36,466	$15,387	2,923,810	1,237,056
Canada	554,791	277,351	42,930	19,555
Central America	12,956	4,782	46,198	14,888
Mexico	348,211	135,177	39,353	12,232
Brazil	2,948,487	969,324	8,147,297	2,495,311
Peru	4,744	3,282	79,177	32,108
Other South America	1,540	1,232	291,289	133,448
British East Indies	13,460,814	5,634,983	14,091,078	5,588,391
Dutch East Indies	2,573,072	1,016,443	4,359,356	1,739,439
Other countries	619,863	333,916	726,248	145,455
Totals	20,560,944	$8,391,877	30,792,822	$11,449,459
Balata	39,799	21,670	180,335	123,654
Guayule	.....	.....	.....	.....
Jelutong (Pontianak)	1,045,197	74,499	1,275,699	145,165
Gutta Percha	.....	.....	56,666	14,160
Totals	1,084,996	$96,169	1,512,700	$282,979
Rubber scrap	492,236	60,746	976,924	72,872
Totals, unmanufactured	22,138,176	$8,548,792	33,282,446	$11,805,310
Chicle (dutiable)	641,581	308,805	503,032	343,497
MANUFACTURED—*dutiable:*				
India rubber and gutta percha	.....	$29,520	.....	$224,812
India rubber substitutes	315,946	30,940	112	98

EXPORTS OF DOMESTIC MERCHANDISE.

MANUFACTURED—				
Automobile tires[1]	.....	$1,320,966	.....	$2,120,477
All other tires[1]	.....	120,188	.....	136,907
Scrap and old	243,551	38,734	1,340,082	126,083
Reclaimed rubber	180,485	33,543	286,039	48,840
Belting, hose, and packing	.....	299,600	.....	414,814
Boots[1] ..... *pairs*	74,454	340,350	28,542	75,659
Shoes[1] ..... *pairs*	63,394	979,654	702,744	631,150
Druggists' rubber sundries[1]	.....	64,073	.....	108,929
Insulated wire and cables[1]	.....	548,640	.....	301,315
Other rubber manufactures[1]	.....	441,634	.....	4,313,668
Total, manufactured	561,884	$4,187,382	2,357,407	$8,277,842
Fountain pens ..... *number*	7,202	6,145	47,971	43,816

EXPORTS OF FOREIGN MERCHANDISE.

UNMANUFACTURED—				
India rubber	72,540	$29,432	503,587	$219,675
Balata	112,000	62,100	3,712	2,789
Guayule	990	475	.....	.....
Jelutong (Pontianak)	1,565	164	.....	.....
Totals, unmanufactured	187,095	$92,171	507,299	$222,464
MANUFACTURED—				
India rubber	.....	$361	.....	.....
Gutta percha	.....	.....	.....	$5,546
Rubber substitutes, elasticon, etc.	.....	.....	.....	.....
Totals, manufactured	.....	$361	.....	$5,546
Chicle	1,500	1,112	.....	.....

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

MANUFACTURED—				
To Alaska:				
Belting, hose and packing	.....	$5,161	.....	$5,561
Boots and shoes...*pairs*	8,771	16,509	5,882	14,483
Other rubber goods	.....	7,048	.....	6,491
Totals	8,771	$28,718	5,882	$26,535
To Hawaii:				
Belting, hose and packing	.....	$6,847	.....	$3,540
Automobile tires	.....	110,359	.....	86,649
Other tires	.....	1,442	.....	1,043
Other rubber goods	.....	6,611	.....	13,880
Totals	.....	$125,259	.....	$105,112
To Philippine Islands:				
Belting, hose and packing	.....	$19,432	.....	$22,296
Boots and shoes...*pairs*	.....	.....	3,054	4,225
Tires	.....	81,256	.....	82,151
Other rubber goods	.....	8,563	.....	8,053
Totals	.....	$109,251	3,054	$116,725
To Porto Rico:				
Belting, hose and packing	.....	$824	.....	$4,703
Automobile tires	.....	65,883	.....	82,454
Other tires	.....	1,427	.....	468
Other rubber goods	.....	11,165	.....	16,807
Totals	.....	$79,299	.....	$104,432

[1] Details of exports of domestic merchandise by countries during September, 1919, are given on Pages 194-195 of this issue.

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	July. 1918. Pounds.	1918. Value.	1919. Pounds.	1919. Value.
UNMANUFACTURED—*free:*				
India rubber:				
From United Kingdom	127,690	$64,744	678,016	$310,552
Canada	239,572	117,179	174,362	80,194
Central America	5,121	1,186	27,956	9,265
Mexico	197,477	78,006	1,155	252
Brazil	2,803,042	879,430	2,055,583	579,257
Other South America	130,471	37,869	179,562	67,963
British East Indies	32,404,172	13,467,040	40,109,576	16,390,865
Dutch East Indies	3,663,614	1,696,412	8,707,707	3,602,738
Other countries	877,410	454,955	703,891	271,183
Totals	40,448,569	$16,796,821	52,637,808	$21,312,269
Balata	180,513	$109,949	105,432	$86,104
Guayule	.....	.....	285,548	67,453
Jelutong (Pontianak)	846,660	74,090	4,000,945	437,606
Gutta percha	246,755	82,644	1,264,364	200,032
Totals	1,273,928	$266,683	5,656,289	$791,195
Rubber scrap	692,262	$49,841	1,014,464	$71,799
Totals, unmanufactured	42,414,759	$17,113,345	59,308,561	$21,175,263
Chicle (dutiable)	409,216	221,156	795,190	530,146
MANUFACTURED—*dutiable:*				
India rubber and gutta percha	.....	$36,106	.....	$52,776
India rubber substitutes	178,771	32,668	16	6

EXPORTS OF DOMESTIC MERCHANDISE.

MANUFACTURED—				
Automobile tires[1]	.....	$1,217,584	.....	$1,570,017
All other tires[1]	.....	54,815	.....	38,766
Scrap and old	296,346	24,062	752,599	78,107
Reclaimed rubber	125,358	22,832	467,292	78,992
Belting, hose and packing[1]	.....	343,887	.....	400,377
Boots[1] .....*pairs*	8,327	26,470	20,396	59,409
Shoes[1] .....*pairs*	62,717	56,304	131,412	114,436
Druggists' rubber sundries[1]	.....	53,670	.....	74,733
Insulated wire and cables[1]	.....	477,448	.....	659,893
Other rubber manufactures[1]	.....	490,652	.....	474,331
Totals manufactured	492,748	$2,767,724	1,371,699	$3,549,061
Fountain pens	7,483	6,424	53,490	51,542

EXPORTS OF FOREIGN MERCHANDISE.

UNMANUFACTURED—				
India rubber	352,263	$195,636	437,414	$199,046
Balata	61,857	43,530	44,657	20,599
Jelutong (Pontianak)	.....	.....	27,480	6,192
Totals unmanufactured	414,120	$239,166	509,551	$225,837
Scrap	777	$23	.....	.....
MANUFACTURED—				
India rubber	.....	521	.....	.....
Gutta percha	.....	.....	.....	$3,550
Rubber substitutes, elasticon, etc.	44,293	9,463	.....	.....
	44,970	$10,007	.....	$3,350
Chicle	13,810	12,548	.....	.....

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

MANUFACTURED—				
To Alaska:				
Belting, hose and packing	.....	$1,961	.....	$8,678
Boots and shoes....*pairs*	1,124	4,223	5,721	15,574
Other rubber goods	.....	1,706	.....	6,657
Totals	1,124	$7,890	5,721	$30,909
To Hawaii:				
Belting, hose and packing	.....	948	.....	6,740
Automobile tires	.....	12,343	.....	43,811
Other tires	.....	36	.....	1,841
Other rubber goods	.....	264	.....	11,333
Totals	.....	$13,591	.....	$63,725
To Philippine Islands:				
Belting, hose and packing	.....	30,685	.....	12,633
Boots and shoes....*pairs*	534	724	5,359	7,859
Tires	.....	53,248	.....	48,976
Other rubber goods	.....	11,015	.....	18,574
Totals	534	$95,672	5,359	$88,042
To Porto Rico:				
Belting, hose and packing	.....	4,393	.....	3,761
Automobile tires	.....	74,931	.....	132,865
Other tires	.....	1,325	.....	1,348
Other rubber goods	.....	9,178	.....	21,754
Totals	.....	$89,827	.....	$159,728

[1] Details of exports of domestic merchandise by countries during July, 1919, were given on page 63 of the October issue.

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	August. 1918. Pounds.	1918. Value.	1919. Pounds.	1919. Value.
UNMANUFACTURED—*free:*				
India rubber:				
From France	.....	.....	129,960	$32,268
Portugal	.....	.....	.....	.....
United Kingdom	54,948	$21,312	1,760,940	739,862
Canada	731,466	358,456	52,321	15,218
Central America	.....	.....	9,487	4,568
Mexico	106,380	32,085	5,466	1,576
Brazil	1,905,367	562,559	2,598,977	741,892
Peru	.....	.....	244,438	104,489
Other South America	67,142	29,451	179,514	87,749
British East Indies	14,444,522	6,492,061	17,108,838	6,918,405
Dutch East Indies	3,449,469	1,383,705	44,850	16,893
Other countries	707,288	399,494	325,042	123,021
Totals	21,466,582	$9,279,123	22,459,833	$8,785,941
Balata	73,684	44,395	139,103	93,142
Guayule	58,686	23,474	.....	.....
Jelutong (Pontianak)	1,947,16	125,847	885,234	87,436
Gutta percha	2,217	4,900	316,575	65,798
Totals	2,082,303	$198,616	1,340,912	$246,376
Rubber scrap	621,564	43,167	649,421	54,026
Totals, unmanufactured	24,170,449	$9,520,906	24,450,166	$9,086,343
Chicle (dutiable)	255,138	144,724	377,187	229,748
MANUFACTURED—*dutiable:*				
India rubber and gutta percha	.....	53,609	.....	46,284
India rubber substitutes	1,248,731	171,957	18,816	3,127

EXPORTS OF DOMESTIC MERCHANDISE.

MANUFACTURED—				
Automobile tires[1]	.....	$1,418,589	.....	$2,351,064
All other tires[1]	.....	64,667	.....	110,573
Scrap and old	81,629	4,265	1,007,037	90,118
Reclaimed rubber	172,516	31,549	334,413	50,675
Belting, hose, and packing[1]	.....	444,210	.....	518,310
Boots[1] .....*pairs*	33,418	113,583	30,881	78,745
Shoes[1]	231,161	641,529	640,921	459,142
Druggists' rubber sundries[1]	.....	68,750	.....	95,938
Insulated wire and cables[1]	.....	677,485	.....	741,443
Other rubber manufactures[1]	.....	640,525	.....	789,177
Totals, manufactured	518,724	$4,105,152	2,013,252	$5,285,185
Fountain pens.....*number*	13,109	9,328	27,334	23,103

EXPORTS OF FOREIGN MERCHANDISE.

UNMANUFACTURED—				
India rubber	229,484	$118,502	254,263	$105,065
Balata	.....	.....	5,900	2,065
Gutta percha	.....	.....	.....	.....
Jelutong (Pontianak)	.....	.....	2,672	481
Totals	229,484	$118,502	262,835	$107,611
Rubber scrap	.....	.....	422	$12
Totals, unmanufactured	229,484	$118,502	263,257	$107,623
MANUFACTURED—				
India rubber	.....	$7,042	.....	.....
Gutta percha	.....	.....	.....	$317
Rubber substitutes, elasticon, etc.	.....	.....	305	155
Totals, manufactured	.....	$7,042	305	$472

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

MANUFACTURED—				
To Alaska:				
Belting, hose and packing	.....	$8,130	.....	$9,194
Boots and shoes.....*pairs*	10,133	24,517	8,921	22,045
Other rubber goods	.....	4,776	.....	5,621
Totals	10,133	$37,423	8,921	$36,760
To Hawaii:				
Belting, hose and packing	.....	$9,637	.....	$8,284
Automobile tires	.....	62,334	.....	80,186
Other tires	.....	534	.....	2,073
Other rubber goods	.....	7,223	.....	8,651
Totals	.....	$79,728	.....	$99,194
To Philippine Islands:				
Belting, hose and packing	.....	$9,937	.....	$50,152
Boots and shoes.....*pairs*	.....	.....	21,637	26,444
Tires	.....	143,153	.....	97,311
Other rubber goods	.....	83,054	.....	64,370
Totals	.....	$236,144	.....	$238,277
To Porto Rico:				
Belting, hose and packing	.....	$2,008	.....	$4,819
Automobile tires	.....	47,081	.....	87,704
Other tires	.....	20	.....	667
Other rubber goods	.....	1,519	.....	16,528
Totals	.....	$50,628	.....	$109,718

[1] Details of exports of domestic merchandise by countries during August, 1919, were given on page 124 of the November issue.

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF SEPTEMBER, 1919.

EXPORTED TO—	Belting, Hose and Packing. Value.	Boots. Pairs.	Boots. Value.	Shoes. Pairs.	Shoes. Value.	Druggists' Rubber Sundries. Value.	Tires. Automobile. Value.	Tires. All Others. Value.	Insulated Wire and Cable. Value.	All Other Rubber Manufactures. Value.	Totals. Value.
EUROPE:											
Austria-Hungary	.....	.....	.....	.....	.....	.....	$5,000	.....	.....	.....	$5,000
Belgium	.....	24	$64	192	$131	$1,155	129,161	$9,255	$14,222	$12,292	166,280
Denmark	$12,304	228	612	22,558	29,962	1,660	192,511	9,079	9,226	5,786	261,140
Finland	21,538	.....	.....	.....	.....	.....	.....	.....	.....	.....	21,538
France	9,246	.....	.....	3,952	3,747	448	41,317	7	8,317	66,403	129,485
Greece	595	.....	.....	123	143	173	1,384	.....	.....	349	2,644
Iceland and Faroe Islands	.....	1,961	2,484	1,392	1,323	144	12,780	.....	311	113	17,155
Italy	.....	.....	.....	1,800	1,286	50	.....	.....	.....	2,484	3,820
Netherlands	12,412	.....	.....	19,810	16,777	2,373	152,584	27,863	12,611	5,363	229,983
Norway	302	444	891	147,293	121,200	166	55,252	1,016	28,164	9,986	216,977
Portugal	.....	.....	.....	.....	.....	.....	.....	110	.....	.....	110
Roumania	6,093	.....	.....	.....	.....	.....	4,486	.....	.....	241	10,820
Russia in Europe	.....	.....	.....	.....	.....	.....	152	.....	.....	.....	152
Spain	289	.....	.....	1,272	1,016	565	7,594	617	.....	706	10,787
Sweden	.....	.....	.....	39,574	23,967	2,624	261,709	12,990	17,287	24,631	343,208
Switzerland	7,302	.....	.....	87,940	59,876	.....	.....	.....	6,319	4,286	77,783
Turkey in Europe	.....	.....	.....	29,394	27,665	.....	.....	.....	.....	.....	27,665
England	4,491	4,624	9,632	63,043	38,858	32,042	18,023	.....	1,125	60,037	164,208
Scotland	1,910	.....	.....	.....	.....	.....	.....	.....	.....	173	2,083
Ireland	.....	.....	.....	878	241	.....	.....	.....	.....	.....	241
TOTALS, EUROPE	$76,482	7,281	$13,683	419,221	$326,192	$41,400	$881,953	$60,937	$97,582	$192,850	$1,691,079
NORTH AMERICA:											
Bermuda	$99	7	$25	80	$138	.....	.....	.....	$72	$151	$485
British Honduras	42	.....	.....	682	746	.....	$47	$14	.....	86	935
Canada	34,056	10,546	29,894	8,694	9,329	$24,463	113,697	10,383	37,603	253,985	513,410
Costa Rica	1,565	.....	.....	.....	.....	279	232	599	.....	1,308	3,983
Guatemala	1,380	.....	.....	225	253	125	4,434	519	2,161	2,133	11,005
Honduras	1,448	300	909	.....	.....	407	2,217	47	350	685	6,063
Nicaragua	785	.....	.....	.....	.....	755	5,641	.....	60	5,610	12,851
Panama	16,446	224	948	3,026	2,206	2,239	54,314	1,362	3,214	4,189	84,918
Salvador	536	.....	.....	.....	.....	291	2,444	.....	209	3,090	6,570
Mexico	38,037	89	413	3,936	3,774	5,915	61,338	2,651	19,983	19,153	151,264
Miquelon, Langley, etc.	8	528	1,720	12	10	.....	.....	.....	.....	.....	1,738
Newfoundland and Labrador	1,077	6,481	19,864	15,514	12,732	144	3,939	32	1,449	2,424	41,661
Barbados	44	.....	.....	.....	.....	62	7,135	215	219	271	7,946
Jamaica	1,206	.....	.....	798	485	21	13,106	.....	860	450	16,128
Trinidad and Tobago	947	.....	.....	.....	.....	.....	3,968	96	6	285	5,302
Other British West Indies	161	.....	.....	432	302	.....	900	26	22	405	1,816
Cuba	23,799	48	231	20,638	14,151	4,065	87,232	3,972	18,248	21,919	173,617
Danish West Indies	369	.....	.....	15	24	3	613	.....	141	134	1,284
Dutch West Indies	83	.....	.....	15	10	18	1,253	11	.....	36	1,411
French West Indies	314	.....	.....	67	52	.....	22,028	130	1,170	289	23,983
Haiti	1,973	.....	.....	229	276	85	5,238	32	663	133	8,400
Dominican Republic	1,777	.....	.....	183	217	1,578	7,582	565	2,767	2,424	16,910
TOTALS, NORTH AMERICA	$126,152	18,223	$54,004	54,546	$44,705	$40,450	$397,358	$20,654	$89,197	$319,160	$1,091,680
SOUTH AMERICA:											
Argentina	$6,055	.....	.....	1,329	$1,311	$3,159	$138,019	$22,987	$14,898	$12,627	$199,056
Bolivia	.....	.....	.....	.....	.....	9	4,359	.....	.....	569	4,937
Brazil	18,090	48	$144	526	394	811	49,085	353	8,849	2,908	80,634
Chile	3,989	228	1,182	242	250	421	17,911	157	9,320	1,793	35,023
Colombia	1,946	.....	.....	298	309	1,282	15,500	1,340	5,329	3,522	29,728
Ecuador	1,084	.....	.....	504	450	469	6,066	73	1,544	723	10,409
British Guiana	142	.....	.....	7	6	.....	867	.....	46	238	1,299
Dutch Guiana	78	.....	.....	.....	.....	.....	.....	.....	2,781	54	2,913
Paraguay	.....	.....	.....	.....	.....	.....	.....	.....	.....	525	525
Peru	1,770	.....	.....	.....	.....	966	12,401	292	805	1,340	17,574
Uruguay	1,421	35	123	284	390	669	36,487	.....	1,226	11,695	52,011
Venezuela	2,139	.....	.....	35	27	1,744	52,225	353	1,412	1,403	59,303
TOTALS, SOUTH AMERICA	$36,714	311	$1,449	3,225	$3,137	$9,530	$332,920	$26,055	$46,210	$37,397	$493,412
ASIA:											
Aden	.....	.....	.....	.....	.....	.....	$1,644	.....	.....	.....	$1,644
China	$2,981	2	$2	5,972	$7,200	$3,087	18,797	.....	$48,833	$3,041	83,941
Japanese China	.....	150	1,100	3,350	3,945	45	.....	.....	.....	7,508	12,598
Chosen	.....	.....	.....	576	496	70	223	.....	300	99	1,188
British India	1,040	.....	.....	936	896	274	29,557	$390	1,711	1,147	35,015
Straits Settlements	1,225	.....	.....	48	55	.....	54,779	5,100	265	140	61,564
Dutch East Indies	3,724	.....	.....	.....	.....	40	24,636	.....	643	180	29,223
French East Indies	.....	.....	.....	.....	.....	.....	88	.....	.....	.....	88
Hongkong	.....	.....	.....	.....	.....	206	3,843	.....	256	441	4,746
Japan	4,248	2,120	4,149	93,306	98,880	1,201	28,248	1,315	807	32,118	170,966
Persia	.....	.....	.....	.....	.....	.....	525	.....	.....	.....	525
Russia in Asia	23,708	49	330	103,659	131,975	516	572	.....	.....	495	157,596
Siam	.....	.....	.....	.....	.....	.....	64	.....	.....	.....	64
TOTALS, ASIA	$36,926	2,321	$5,581	207,847	$243,447	$5,439	$162,976	$6,805	$52,815	$45,169	$559,158
OCEANIA:											
Australia	$6,832	.....	.....	11,035	$6,452	$8,097	$78,581	$4,018	$5,257	$22,875	$132,112
New Zealand	54,884	.....	.....	2,264	1,788	747	140,000	5,769	1,209	11,324	215,721
Other British Oceania	.....	.....	.....	.....	.....	137	683	.....	.....	150	970
French Oceania	35	.....	.....	48	80	.....	1,035	595	17	142	1,904
German Oceania	.....	.....	.....	.....	.....	.....	1,592	.....	.....	241	1,833
Philippine Islands	22,296	84	$227	2,970	3,998	2,282	71,090	11,061	8,020	5,771	124,745
TOTALS, OCEANIA	$84,047	84	$227	16,317	$12,318	$11,263	$292,981	$21,443	$14,503	$40,503	$477,285
AFRICA:											
Belgian Kongo	$395	.....	.....	4	$5	.....	.....	.....	.....	$12	$412
British West Africa	.....	1	$7	.....	.....	.....	$16,280	.....	.....	165	16,452
British South Africa	54,081	321	708	1,512	1,289	$781	35,164	$1,001	$659	15,388	109,071
British East Africa	.....	.....	.....	72	57	42	.....	.....	349	.....	448
French Africa	.....	.....	.....	.....	.....	.....	40	12	.....	7	59
Egypt	17	.....	.....	.....	.....	24	805	.....	.....	158	1,004
TOTALS, AFRICA	$54,493	322	$715	1,588	$1,351	$847	$52,289	$1,013	$1,008	$15,730	$127,446
TOTALS	$414,814	28,542	$75,659	702,744	$631,150	$108,929	$2,120,477	$136,907	$301,315	$650,809	$4,440,060

SHIPMENTS TO NON-CONTIGUOUS TERRITORY.

	Belting Hose and Packing. Value.	Boots and Shoes. Pairs.	Boots and Shoes. Value.	Druggists' Rubber Sundries. Value.	Tires. Automobiles. Value.	Tires. All Others. Value.	Insulated Wire and Cables. Value.	All Other Manufactures of Rubber. Value.	Totals. Value.
Hawaii	$3,540	11,234	$11,776	.....	$86,649	$1,043	.....	$2,104	$116,346
Porto Rico	4,703	10,472	8,499	.....	82,454	468	.....	8,308	114,904
TOTALS	$8,243	21,706	20,275	.....	$169,103	$1,511	.....	$10,412	$231,250

(Compiled by the Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D. C.)

UNITED STATES CRUDE RUBBER IMPORTS FOR 1919 (BY MONTHS).

1919.	Plantations.	Paras.	Africans.	Centrals.	Guayule.	Manicoba and Matto Grosso.	Totals for 1919.	Totals for 1918.
January ....*tons*	4,906	2,141	2	114	72	...	7,235	16,084
February	14,079	2,701	489	100	87	...	17,456	13,108
March	23,680	3,808	337	211	187	...	28,223	17,161
April	24,678	2,794	90	144	380	110	28,146	13,425
May	14,856	772	389	97	234	...	16,348	16,288
June	13,645	1,706	264	263	390	51	16,319	24,124
July	17,645	121	16	82	101	...	17,965	16,092
August	8,221	2,594	137	74	41	...	11,067	10,421
September	10,143	3,423	312	51	11	96	14,036	5,353
October	25,483	2,590	508	108	25	174	28,888	9,509

(Compiled by The Rubber Association of America, Inc.)

UNITED KINGDOM RUBBER STATISTICS.

IMPORTS.

	September. 1918. Pounds.	1918. Value.	1919. Pounds.	1919. Value.
UNMANUFACTURED—				
Crude rubber:				
From—				
Dutch East Indies	252,600	£29,054	2,261,600	£229,243
French West Africa	91,200	7,199	6,700	560
Gold Coast	97,500	6,261	7,200	717
Other African countries	744,600	66,301	135,800	11,762
Peru	400	55	158,700	15,452
Brazil	132,600	15,114	1,479,900	159,426
British India	217,100	24,579	297,000	30,349
Straits Settlements and dependencies, including Luabuan	2,937,200	344,715	5,893,800	597,163
Federated Malay States	1,698,300	196,585	2,055,000	204,081
Ceylon and dependencies	2,252,800	241,712	1,551,100	150,133
Other countries	246,300	22,431	137,600	13,676
Totals	8,670,600	£954,006	13,984,400	£1,412,562
Waste and reclaimed rubber	.....	.....	391,700	10,054
Totals, unmanufactured	8,670,600	£954,006	14,376,100	£1,422,616
Gutta percha	813,900	£164,358	597,700	£116,084
MANUFACTURED—				
Boots and shoes...*dozen pairs*	208	£792	31,260	£58,744
Waterproofed clothing	.....	.....	.....	37
Automobile tires and tubes	.....	53,019	.....	274,314
Motorcycle tires and tubes	.....	2,415	.....	709
Bicycle tires and tubes	.....	.....	.....	5,305
Insulated wire	.....	.....	.....	70
Totals	208	£56,226	31,260	£339,179

EXPORTS.

UNMANUFACTURED—				
Waste and reclaimed rubber	263,300	£11,363	1,086,200	£22,510
MANUFACTURED—				
Waterproof clothing	.....	43,903	.....	151,527
Boots and shoes...*dozen pairs*	7,809	11,813	5,813	13,146
Insulated wire	.....	8,823	.....	74,207
Submarine cables	.....	45,214	.....	24,380
Carriage tires and tubes	.....	14,274	.....	20,151
Automobile tires and tubes	.....	144,778	.....	226,946
Motorcycle tires and tubes	.....	11,021	.....	34,532
Bicycle tires and tubes	.....	13,008	.....	138,450
Other rubber manufactures	.....	110,838	.....	215,595
Totals	271,109	£415,035	1,092,013	£921,444

EXPORTS—COLONIAL AND FOREIGN.

UNMANUFACTURED—				
Crude rubber:				
To Belgium	.....	.....	757,300	£64,251
France	1,950,800	£213,001	1,069,200	115,077
Italy	108,000	12,190	133,300	13,517
Russia	.....	.....	.....	.....
United States	24,700	1,813	2,917,800	283,005
Other countries	97,300	14,910	5,896,900	554,578
Totals	2,180,800	£241,914	10,774,500	£1,030,428
Gutta percha	.....	.....	115,400	£15,713
MANUFACTURED—				
Boots and shoes...*dozen pairs*	.....	.....	2	£10
Waterproof clothing	.....	.....	.....	113
Automobile tires and tubes	.....	£2,760	.....	1,336
Motorcycle tires and tubes	.....	.....	.....	172
Totals	.....	£2,760	2	£1,631

RUBBER STATISTICS FOR THE DOMINION OF CANADA.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	August. 1918. Pounds.	1918. Value.	1919. Pounds.	1919. Value.
UNMANUFACTURED—*free:*				
Rubber, gutta percha, etc.:				
From United Kingdom	26,232	$14,731	256,494	$110,790
United States	537,221	265,214	472,119	193,620
British East Indies:				
Ceylon	168,080	73,937	.....	.....
Straits Settlements	990,849	360,149	433,500	163,951
India	360	198	.....	.....
Other countries	.....	.....	500	177
Totals	1,722,742	$714,229	1,162,613	$473,538
Rubber, recovered	189,417	$32,282	296,476	$49,307
Hard rubber sheets and rods	3,919	2,927	5,871	1,991
Hard rubber tubes	.....	909	.....	1,652
Rubber, powdered and rubber or gutta percha scrap	131,937	16,029	315,885	19,790
Rubber thread, not covered	1,983	2,906	2,532	3,410
Rubber substitute	76,102	8,154	67,300	8,246
Totals, unmanufactured	2,126,100	$774,436	1,880,677	$557,934
Balata	.....	.....	.....	.....
Chicle	4,584	$2,948	217,003	$182,584
MANUFACTURED—*dutiable:*				
Boots and shoes	.....	13,126	.....	22,528
Waterproofed clothing	.....	5,305	.....	12,885
Belting, hose and packing	.....	43,294	43,294	24,718
Gloves and hot-water bottles	.....	.....	(1)	1,645
Tires	.....	68,016	.....	133,528
Other manufactures	.....	141,753	.....	182,329
Totals, manufactured	.....	$271,494	.....	$374,633
Totals, imports	.....	$1,048,878	.....	$1,115,151

[1] Included in "Other manufactures."

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

	August. 1918. Produce of Canada. Value.	1918. Reexports of Foreign Goods. Value.	1919. Produce of Canada. Value.	1919. Reexports of Foreign Goods. Value.
UNMANUFACTURED—				
Crude and waste rubber	$1,903	.....	$24,366	.....
MANUFACTURED—				
Hose	14,587	.....	11,602	.....
Boots and shoes	416,740	$637	172,202	$187
Clothing	8	.....	3,889	12
Tires	310,611	426	727,521	598
Waste	.....	.....	.....	17,536
Belting	1,508	.....	647	.....
All other—n. o. p.	16,511	346	22,119	2,086
Totals	$761,868	$1,409	$962,346	$20,419
Chicle	.....	.....	$114,151	.....
Totals, exports	$761,868	$1,409	$1,076,497	$20,419

RUBBER STATISTICS FOR ITALY.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Four Months Ended April. 1918. Quintals.[1]	1918. Lire.[2]	1919. Quintals.	1919. Lire.
UNMANUFACTURED—				
India rubber and gutta percha— raw and reclaimed:				
From Great Britain	3,363	.....	.....	.....
India and Ceylon	1,263	.....	17,856	.....
Straits Settlements	8,860	.....	12,219	.....
French African Colonies	1,743	.....	1,007	.....
Belgian Congo	61	.....	94	.....
Brazil	1,870	.....	11,580	.....
Other countries	1,141	.....	915	.....
Totals	18,301	20,131,100	43,671	48,038,100
Rubber scrap	168	20,160	12	1,440

UNITED KINGDOM RUBBER STATISTICS.

IMPORTS.

	Four Months Ended April. 1918. Quintals.[1]	1918. Lire.[2]	1919. Quintals.	1919. Lire.
MANUFACTURED—				
India rubber and gutta percha—raw and reclaimed:				
Threads	90	198,000	123	270,600
Sheets:				
Cut sheets	.....	.....	2	4,400
Other kinds, including hard rubber	13	15,600	82	98,400
Tubes:				
Hose	68	61,200	34	30,600
Other forms	.....	.....	17	18,700
Belting	255	280,500	84	92,400
Rubber coated fabrics—*pieces:*				
For carding combs	78	101,400	108	140,400
Other forms	3	4,500	9	13,500
Boots and shoes—*pairs*	12,833	153,990	9,526	114,312
Elastic webbing	59	118,000	88	176,000
Manufacturers, n. e. s.:				
From cut sheets	4	10,400	3	7,800
Elastic fabric	312	374,400	1,070	1,284,000
From France	985	2,212,200	1,859	3,830,400
Great Britain	244		269	
Other rubber manufactures:				
Tires and tubes:				
From France	1,174		241	
Great Britain	425	2,053,200	5,846	7,312,800
United States	111		7	
Other countries	1			
Totals, manufactured	.....	5,583,396	.....	13,394,312
Total imports	.....	25,734,656	.....	61,433,852

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED—				
India rubber and gutta percha—raw and reclaimed:				
To Spain	585	245,000	1,726	915,600
To United States	115		890	
Totals	.....	245,000	.....	915,600
MANUFACTURED—				
India rubber and gutta percha—				
Threads	18	39,600	126	277,200
Sheets:				
Cut sheets	6	12,000	39	78,000
Elastic fabric	20	16,000	1	800
Other kinds, including hard rubber	20	20,000	12	12,000
Tubes:				
Inner tubes	3	6,600	12	26,400
Hose	86	68,800	132	105,600
Other forms	64	60,800	105	99,750
Belting	35	35,000	94	94,000
Rubber-coated fabrics—*pieces*	38	45,600	42	50,400
Elastic webbing	262	497,800	272	516,800
Clothing and articles for travel	3	8,400	1	2,800
Manufactures of india rubber and gutta percha, n. e. s.:				
From cut sheets	45	99,000	42	92,400
Elastic fabrics	57	62,700	62	68,200
Tires and tubes:				
To France	190		83	
To Great Britain	971		1,493	
Spain	81		2	
Switzerland	.....		4	
British India and Ceylon	.....	3,074,500	100	4,849,000
Dutch East Indies	441		.....	
Straits Settlements	.....		130	
Argentina	4		274	
Brazil	434		303	
Other countries	244		1,341	
Other rubber manufactures:				
To France	70		63	
Great Britain	86		50	
Spain	7		5	
Switzerland	109		29	
Egypt	21	404,000	9	471,000
Argentina	31		58	
Brazil	17		11	
Uruguay	8		5	
Other countries	55		241	
Totals, manufactured	.....	4,450,800	.....	6,744,350
Total exports	.....	4,695,800	.....	7,659,950

[1] A quintal = 220.46 pounds.
[2] A lira = $0.193.

THE MARKET FOR RUBBER SCRAP.

NEW YORK.

THE RUBBER SCRAP MARKET continues to show no increase in activity. Transactions in boots and shoes furnished the bulk of the business. The mechanical scrap market has been without incident in the absence of all demand on the part of reclaimers. In tires the only business has been between dealers for picking purposes and the salvage of fabric for the tire rebuilding trade. Prices in all grades of rubber scrap continue strictly nominal and there is scarcely sale for any grade.

QUOTATIONS FOR CARLOAD LOTS DELIVERED.

NOVEMBER 25, 1919.

Prices subject to change without notice.

BOOTS AND SHOES:			
Arctic tops	lb.	.01 @	
Boots and shoes	lb.	.08¾ @	.08½
Trimmed arctics	lb.	.06½ @	.06⅝
Untrimmed arctics	lb.	.05⅝ @	
HARD RUBBER:			
Battery jars, black compound	lb.	.01 @	
No. 1, bright fracture	lb.	.23 @	.24
INNER TUBES:			
No. 1, old packing	lb.	.19 @	.20
No. 2	lb.	.10½ @	.10¾
Red	lb.	.10 @	.10½
MECHANICALS:			
Black scrap, mixed, No. 1	lb.	.03½ @	.04
No. 2	lb.	.03 @	
Car springs	lb.	.03½ @	.04
Heels	lb.	.03 @	.03½
Horse-shoe pads	lb.	.03 @	.03½
Hose, air brake	lb.	.04¼ @	
fire, cotton lined	lb.	.01½ @	.01¾
garden	lb.	.01½ @	.01¾
Insulated wire stripping, free from fiber	lb.	.03½ @	.04
Matting	lb.	.01¼ @	.01½
Red packing	lb.	.05½ @	.06
Red scrap, No. 1	lb.	.09 @	.10
No. 2	lb.	.06¾ @	.07¼
		.10 @	.11
		.08 @	.09
TIRES:			
PNEUMATIC—			
Auto peelings, No. 1	lb.	.07 @	.08
No. 2	lb.	.05 @	.05½
Bicycle	lb.	.03 @	.03¼
Standard white auto	lb.	.03¾ @	.03⅞
Standard mixed auto	lb.	.04 @	
Stripped, unguaranteed	lb.	.03 @	
White, G. & G., M. & W., and U. S.	lb.	.05 @	.05¼
SOLID—			
Carriage	lb.	.04 @	.04¼
Irony	lb.	.01 @	
Truck	lb.	.03½ @	.03¾

THE MARKET FOR COTTON AND OTHER FABRICS.

NEW YORK.

AMERICAN COTTON. In November the spot price for middling uplands cotton advanced steadily in a speculative market until the middle of the month. It had reached 38.40 cents in the last week of October and kept going up till it reached 40.20 cents on November 11, that being the highest price for the month. For a week longer it kept a shade under 40 cents until the break in the stock market, when it dropped suddenly a hundred points, falling to 38.65 cents on November 18. It then climbed up again to 39.25 cents on November 22.

EGYPTIAN COTTON. The market during November has undergone another great rise, but now seems steady for the time being. Medium to good Sakellarides is quoted at 75 to 80 cents; upper Egyptian is practically all sold and only a small supply of very high grades is available. Low grade Sakellarides is also scarce. The total crop is estimated at just under 6,250,000 cantars and though the total of Egyptian sales is larger than usual it is believed that a good deal of the cotton is in the hands of speculators.

AMERICAN-EGYPTIAN COTTON. The Egyptian from Arizona is quoted at 85 to 90 cents, with few recent sales at the higher figure. The crop estimate is now a little under 50,000 bales for the season. Ginning is progressing steadily.

SEA ISLAND COTTON is moving very slowly. The crop is so small that it is practically negligible, but average extra choice is quoted at 85 cents and both Sea Island and Arizona long staple are a little ahead of the Egyptian cotton. The Government's estimate of the Sea Island crop, 15,000 tons, seems to be too high.

LONG-STAPLE COTTON of any kind that can be used for tire fabrics has been sold to the end of 1920, so that no prices are quoted; even the supply of 1¼ white cotton, or peelers, is oversold, and that is true of upper Egyptian also. Spinners of yarn are asking $2 a pound.

TIRE FABRICS. The scarcity of long-staple cotton has practically closed the market for tire fabrics. No cord fabrics are to

be had as the supply has been sold out to the end of 1920. All grades of cotton and cotton duck used in the manufacture of pneumatics have gone up from 35 to 40 per cent in the last six months and the cotton used in cord tires now costs more than the rubber. Even with inferior substitutes the demand cannot be met. Prices are nominal.

OTHER FABRICS. The excess of demand over supply holds good for other fabrics also, owing to the general shortage of the cotton crop. All supplies for next year are practically sold out, which affects the manufacture of waterproofing materials, of hose and belting, and also of sheetings and drills and ducks for 1920.

NEW YORK QUOTATIONS.

NOVEMBER, 25, 1919.

Prices subject to change without notice.

ASBESTOS CLOTH:			
Brake lining, 2½ lbs. sq. yd., brass or copper insertion	*lb.*	.90 @	.95
2¼ lbs. sq. yd., brass or copper insertion	*lb.*	.95 @	1.05
BURLAPS:			
32—7-ounce	100 *yards*	*12.50 @	
32—8-ounce		*13.50 @	
40—7½-ounce		13.50 @	13.55
40—8-ounce		13.50 @	13.60
40—10-ounce		17.75 @	17.80
40—10½-ounce		17.75 @	17.85
45—7½-ounce		*16.85 @	
45—8-ounce		*17.00 @	
45—9½-ounce		None	
48—10-ounce		*20.00 @	

TIRE FABRICS

JENCKES SPINNING COMPANY

PAWTUCKET RHODE ISLAND

AKRON OFFICE
407 Peoples Savings & Trust Co. Building.

DRILLS:			
38-inch 2.00-yard	*yard*	* .40 @	
40-inch 2.47-yard		* .32¼ @	
52-inch 1.90-yard		* .46⅞ @	
52-inch 1.95-yard		* .46¾ @	
60-inch 1.52-yard		* .60 @	
DUCK:			
CARRIAGE CLOTH:			
38-inch 2.00-yard enameling duck	*yard*	* .42½ @	
38-inch 1.74-yard		* .49 @	
72-inch 16.66-ounce		* .99¼ @	
72-inch 17.21-ounce		* 1.06 @	
MECHANICAL:			
Hose	*pound*	* .72 @	
Belting		* .72 @	
HOLLANDS, 40-INCH:			
Acme	*yard*	.30 @	
Endurance		* .38 @	
Penn		* .46 @	
OSNABURGS:			
40-inch 2.35-yard	*yard*	* .34 @	
40-inch 2.48-yard		* .32¼ @	
37½-inch 2.42-yard		* .33 @	
RAINCOAT FABRICS:			
COTTON:			
Bombazine 64 x 60 water-repellent	*yard*	* .24 @	
60 x 48 not water-repellent		* .21 @	
Cashmeres, cotton and wool, 36-inch, tan		1.05 @	
Twills 64 x 72		.44 @	
64 x 102		.46 @	
Twill, mercerized, 36-inch		.57½ @	.60
Tweed		.60 @	.70
printed		.25 @	
Plaids 60 x 48		.22 @	
56 x 44		.21 @	
Repp		.45 @	.50
Surface prints 60 x 48		.22½ @	
64 x 60		.25 @	
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES:			
63-inch, 3¼ to 7½ ounces	*yard*	1.30 @	3.50
36-inch, 2¾ to 5 ounces		.75 @	1.90
IMPORTED PLAID LINING (UNION AND COTTON):			
63-inch, 2 to 4 ounces	*yard*	.90 @	1.85
36-inch, 2 to 4 ounces		.55 @	1.10
DOMESTIC WORSTED FABRICS:			
36-inch, 4½ to 8 ounces	*yard*	.65 @	1.50
DOMESTIC WOVEN PLAID LININGS (COTTON):			
36-inch, 3¾ to 5 ounces		.21 @	.32
SHEETINGS:			
40-inch, 2.35-yard	*yard*	.33 @	
40-inch, 2.50-yard		.31 @	
40-inch, 2.70-yard		.28¾ @	
40-inch, 2.85-yard		.27 @	
40-inch, 3.15-yard		.35 @	
40-inch, 3.60-yard		.25 @	
JACKET:			
Delaware	*yard*	* .30 @	
Schuykill	*yard*	* .37 @	
SILKS:			
Canton, 38-inch	*yard*	.72½ @	
Schappe, 36-inch		.87½ @	
TIRE FABRICS:			
17¼-ounce Sea Island, combed	*pound*	1.80 @	2.00
17¼-ounce Egyptian, combed		1.80 @	2.00
17¼-ounce Egyptian, carded		1.80 @	2.00
17¼-ounce, Peelers, combed		1.80 @	2.00
17¼-ounce Peelers, carded		1.10 @	1.20

*Nominal.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS.

NEW YORK.

THE ABNORMAL DEMANDS for supplies by rubber goods manufacturers and the paint industry, together with the strikes of steel makers, coal miners and longshoremen, have produced an unprecedented shortage in all lines. In practically every line products are back-ordered several months and spot stocks are extremely low.

There has been a good demand for certain earths, clays and fillers, possibly as substitutes. It has been impossible to supply some of these lines for the reason that production has been limited.

ANILINE OIL. The demand exceeds the supply. During the past month prices have advanced three cents per pound.

BARYTES. The mills are turning out approximately their maximum production in spite of adverse labor conditions. European competition is expected as soon as normal trade relations are resumed.

BENZOL. The steel workers' strike reduced the benzol output to 16 per cent of normal and now if the strike of the bituminous miners is not promptly terminated, production will cease. No spot stock is available.

LITHARGE. The demand very much exceeds the producing capacity and this condition may continue indefinitely.

LITHOPONE. The demand is record breaking and certain makers have been inclined to advance prices. This tendency has, for the present, however, been overruled and the price remains steady.

SUBLIMED LEAD. The manufacturers report the demand out of all proportion to the supply. The price remains steady at about 8½ cents.

SULPHUR. There is a uniform demand from consumers and prices are reasonable and steady.

WHITING. The importation of chalk has been in an unsettled condition owing to British labor disturbances. For this reason the strong demand prevents accumulation of stocks.

ZINC OXIDE. The mills are operating 24 hours per day, but are unable to meet the demand, which is particularly notable on the part of makers of automobile tires. Prices remain unchanged.

NEW YORK QUOTATIONS.

NOVEMBER 25, 1919.

Subject to change without notice.

ACCELERATORS, ORGANIC.				
Accelerator, N. C. C.	lb.	$0.50	@	
Accelerene, New York	lb.	4.75	@	
Accelemal	lb.	.55	@	
Aldehyde ammonia crystals	lb.	1.15	@	1.25
Aniline oil	lb.	.32	@	
Excellerex	lb.	.65	@	.75
Hevaa hylene tetramine (powdered)	lb.	1.05	@	1.15
Paraphenylenediamine	lb.	2.50	@	2.75
Thiocarbanilide	lb.	.55	@	
ACCELERATORS, INORGANIC.				
Lead, dry red (bbls.)	lb.	.10¼	@	
sublimed blue (bbls.)	lb.	.08¼	@	
sublimed white (bbls.)	lb.	.08¼	@	
white, basic carbonate (bbls.)	lb.	.09	@	
Lime, flour	lb.	.02	@	.02½
Litharge, domestic	lb.	.09¾	@	.10¼
sublimed	lb.	.10	@	
imported	lb.	.14	@	.15
Magnesium, carbonate	lb.	.12½	@	
calcined heavy (Thistle)	lb.	.11	@	
light (Manhattan)	lb.	.35	@	
Magnesium oxide	lb.	.25	@	
Magnesite	lb.	.04	@	
ACIDS.				
Acetic, 28 per cent (bbls.)	lb.	.03	@	
glacial, 99 per cent (carboys)	lb.	.12	@	
Cresylic (97% straw color)	gal.	.80	@	
(95% dark)	gal.	.75	@	
Muriatic, 20 degrees	cwt.	1.75	@	2.00
Nitric, 36 degrees	lb.	.06	@	.06½
Sulphuric, 66 degrees	ton	20.00	@	
ALKALIES.				
Caustic soda, 76 per cent (bbls.)	lb.	.05	@	
Soda ash (bbls.)	lb.	.03½	@	
COLORS.				
Black:				
Bone, powdered	lb.	.05	@	
granulated	lb.	.09	@	
Carbon black (sacks, factory)	lb.	.13	@	
Drop	lb.	.06	@	.15
Ivory black	lb.	.16	@	.30
Lamplack	lb.	.15	@	
Oil soluble aniline	lb.	1.25	@	
Rubber black	lb.	.07½	@	
Blue:				
Cobalt	lb.	.25	@	.35
Prussian	lb.	.65	@	.75
Ultramarine	lb.	.18	@	.40
Brown:				
Iron oxide	lb.	.03	@	.03½
Sienna, Italian, raw and burnt	lb.	.05½	@	.15
Umber, Turkey, raw and burnt	lb.	.05	@	.06
Vandyke	lb.	.02½	@	.03½
Green:				
Chrome, light	lb.	.35	@	.40
medium	lb.	.40	@	.50
dark	lb.	.50	@	.60
commercial	lb.	.07	@	.15
Oxide of chromium (casks)	lb.	.75	@	.90
Red:				
Antimony, crimson, sulphuret of (casks)	lb.	.40	@	
Antimony, golden sulphuret of (casks)	lb.	.35	@	
golden sulphuret (States)	lb.	.30	@	
red sulphuret (States)	lb.	.25	@	
vermilion sulphuret	lb.	.55	@	
Arsenic, red sulphide	lb.	.21	@	
Indian	lb.	.14	@	
Toluidine toner	lb.	3.50	@	
Iron oxide, reduced grades	lb.	.03	@	.13
pure bright	lb.	.16	@	
Spanish	lb.	.03½	@	
Venetian	lb.	.05	@	
Oil soluble aniline, red	lb.	2.00	@	
orange	lb.	1.75	@	
Oximony	lb.	.18	@	
Vermilion, English, pale, medium, dark	lb.	1.35	@	
artificial	lb.	.32	@	
English quicksilver	lb.	1.45	@	1.50
White:				
Aluminum bronze, C. P.	lb.	.55	@	
superior	lb.	.60	@	
Lithopone, domestic	lb.	.07	@	.07¼
Ponolith (carloads, factory)	lb.	.07	@	.07¼
Rubber-makers' white	lb.	.06½	@	.06¾
Zinc oxide, Horsehead (less carload, factory):				
"XX red"	lb.	.09	@	.09¼
"Special"	lb.	.09½	@	.09¾
French process, red real	lb.	.09½	@	.09¾
green seal	lb.	.10½	@	.10¾
white seal	lb.	.11½	@	.11¾
(States)	lb.	.08½	@	
Azo, ZZZ, lead free (less carload factory)	lb.	.09¼	@	
ZZ, under 5% leaded (less carload factory)	lb.	.08¾	@	
Z, 8-10% leaded (less carload factory	lb.	.08¼	@	
Yellow:				
Cadmium, sulphide, yellow, light, orange	lb.	2.00	@	
red	lb.	1.85	@	
Chrome, light and medium	lb.	.27	@	
Ochre, domestic	lb.	.02½	@	.03½
imported	lb.	.05	@	.06½
Oil, soluble aniline	lb.	2.00	@	
Zinc chromate	lb.	.40	@	
COMPOUNDING INGREDIENTS.				
Aluminum flake	ton		@	
Aluminum oxide	lb.	*.18	@	
Ammonia carbonate, powdered	lb.	.13¼	@	.14
Asbestine (carloads)	ton	25.00	@	
Asbestos (bags)	ton	35.00	@	
Avoilas compound	lb.	.16	@	
Barium, carbonated, precipitated	ton	65.00	@	
sulphide, precipitated	ton	.07	@	
dust	lb.	.04	@	
Barytes, pure white	ton	37.50	@	40.00
Barytes, off color	ton	18.00	@	20.00
uniform floated	ton	37.00	@	40.00
Basofor	lb.	.04	@	
Blanc fixe	lb.	.04	@	
Bone ash	lb.	.06	@	
Chalk, precipitated, extra light	lb.	.05	@	.05½
precipitated, heavy	lb.	.04	@	.04½
China clay, domestic	ton	8.50	@	20.00
imported	ton	18.00	@	23.50
Shawnee	ton	15.00	@	
Cork flour	lb.	.53	@	
Cotton linters, clean mill run, f. o. b. factory	lb.	.04	@	.04½
Fossil flour (powdered)	ton	50.00	@	
(bolted)	ton	60.00	@	
Diatomite	lb.	.03	@	
Glue, high grade	lb.	.20	@	.40
medium	lb.	.15	@	.19
low grade	lb.	.11	@	.14
Graphite, flake (400-pound bbl.)	lb.	.10	@	.30
amorphous	lb.	.04	@	.08
Ground glass FF. (bbls.)	lb.	.03	@	
Infusorial earth (powdered)	ton	50.00	@	
(bolted)	ton	60.00	@	
Liquid rubber	lb.	16½	@	
Mica, powdered	lb.	.10	@	
Pumice stone, powdered (bbl.)	lb.	.05	@	
Rotten stone, powdered	lb.	.02½	@	.04½
Rub-R-Glu	lb.	*.20	@	.25
Silex (silica)	ton	22.00	@	40.00
Starch, powdered corn (carload, bbls.)	cwt.	5.34	@	
(carload, bags)	cwt.	5.12	@	
Talc, powdered soapstone	ton	15.50	@	17.50
Tripoli earth, air-floated	ton	25.00	@	
Tyre-lith	ton	85.00	@	
Whiting, Alba (carloads)	cwt.	.80	@	.90
Columbia	cwt.	.80	@	
commercial	cwt.	1.25	@	
English cliffstone	cwt.	1.75	@	2.00
gilders	cwt.	1.35	@	
Paris, white, American	cwt.	1.75	@	
Quaker	cwt.	.70	@	.80
Wood pulp, imported	lb.	.03½	@	
Wood flour, American	lb.	.01¾	@	

MINERAL RUBBER.

Gilsonite	ton	47.50	@	57.50
Genasco (carloads, factory)	ton	55.00	@	
(less carloads, factory)	ton	57.00	@	
Hard hydrocarbon	ton	30.00	@	
K-X	ton	110.00	@	
K. M. R.	ton	*40.00	@	60.00
M. R. X.	ton	100.00	@	
Pioneer, carload, factory	ton	55.00	@	
less carload, factory	ton	57.00	@	
Raven M. R.	ton	.50	@	.70
Refined Elaterite	ton	175.00	@	
Richmond	ton	75.00	@	
No. 64	ton	44.00	@	
318/320 M. P. hydrocarbon	ton	50.00	@	
Robertson, M. R. Special (carloads, factory)	ton	80.00	@	
M. R. (carloads, factory)	ton	55.00	@	60.00
Walpole rubber flux (factory)	lb.	.05	@	

OILS.

Castor, No. 1, U. S. P.	lb.	.22½	@	
No. 3, U. S. P.	lb.	.18½	@	
Corn, refined Argo	cwt.	23.56	@	
Cotton	lb.	.22	@	
Glycerine (98 per cent)	lb.	.21	@	
Glycerole	lb.	.55	@	
Linseed, raw (carloads)	gal.	1.90	@	
Linseed compound	gal.	*85	@	
Palm (Niger)	lb.	.17½	@	
Peanut	lb.	.23	@	
Petrolatum	lb.	.06	@	.06¼
Petroleum grease	lb.	.04¾	@	
Pine, steam distilled	gal.	1.28	@	
Rapeseed, refined	gal.	.21	@	
blown	lb.	.21	@	
Rosin	bbl.	18.00	@	
Soya bean	lb.	.18	@	
Tar	gal.	.30	@	.40

RESINS AND PITCHES.

Cantella gum	lb.	.55	@	
Tar, retort	bbl.	15.00	@	15.50
kiln	bbl.	14.50	@	15.00
Pitch, Burgundy	lb.	.09	@	
coal tar	bbl.	7.50	@	
pine tar	lb.	.03½	@	
ponto	lb.	.14	@	
Rosin	bbl.	None		
granulated	lb.	None		
fused	lb.	None		
Rosin, K	bbl.	19.00	@	
Shellac, fine orange	lb.	1.20	@	

SOLVENTS.

Acetone (98.99 per cent drums)	lb.	.15	@	
methyl (drums)	gal.	1.15	@	
Benzol, water white	gal.	.24	@	
Beta-naphthol, resublimed	lb.	1.00	@	
ordinary grade	lb.	.55	@	
Carbon bisulphide (drums)	lb.	.05½	@	.06¼
tetrachloride (drums)	lb.	.11	@	.12½
Naphtha, motor gasoline (steel bbls)	gal.	.24½	@	
73 @ 76 degrees (steel bbls.)	gal.	None		
68 @ 70 degrees (steel bbls.)	gal.	None		
Solvent	gal.	.20	@	
V. M. & P. (steel bbls.)	gal.	.23½	@	
Toluol, pure	gal.	.26	@	.30
Turpentine, spirits	gal.	1.71	@	
wood	gal.	1.65	@	
Osmaco reducer	gal.	.30	@	
Xylol, pure	gal.	.35	@	.40
commercial	gal.	.30	@	.35

SUBSTITUTES.

Black	lb.	.10½	@	.21
White	lb.	.11	@	.23
Brown	lb.	.15	@	.22
Brown factice	lb.	.09	@	.21
White factice	lb.	.11	@	.22
Paragol sift and medium (carloads)	cwt.	18.58	@	
hard	cwt.	18.08	@	

VULCANIZING INGREDIENTS.

Lead, black hyposulphite (Black Hypo)	lb.	.52	@	.56
Orange mineral, domestic	lb.	.13	@	
Sulphur chloride (drums)	lb.	.06½	@	
Sulphur, flour, Brooklyn brand (carloads)	cwt.	3.15	@	
pure soft (carloads)	cwt.	3.15	@	
superfine (carloads, factory)	cwt.	2.50	@	

(See also Colors—Antimony.)

WAXES.

Wax, beeswax, white	lb.	.65	@	.68
ceresin, white	lb.	.16½	@	.18
carnauba	lb.	.47	@	.85
ozokerite, black	lb.	.60	@	.63
green	lb.	.75	@	.78
Montan	lb.	.28	@	.30
substitute	lb.	None		
paraffine, refined 118/120 m. p. (cases)	lb.	.08½	@	
123/125 m. p. (cases)	lb.	.08¾	@	
128/130 m. p. (cases)	lb.	.09¾	@	

*Nominal.

FOREIGN CUSTOMS CHANGES.

BELGIUM.

RUBBER may be exported from Belgium without an export license. This ruling became effective September 19, 1915.

DENMARK.

Denmark has removed the export prohibition as regards motor vehicles complete, including covers and tires, but not that against the exportation of separate tires. Medical hand syringes and thermometers, bandaging materials and vulcanized fiber may also be exported.

FINLAND.

Finland has placed the following articles on the free list of imports: India rubber, gutta percha and balata; rubber sheets and other forms of packing; automobile tires, cycle and motor-cycle parts of rubber, pedal and brake rubbers, inner tubing and the like; India rubber shoes, including goloshes; blocks and plates of hard rubber (ebonite, etc.), even in cut shapes; pipes, strands and rods in cut shapes, knife handles and packings of hard rubber.

BULGARIA.

Bulgaria now permits the importation of rubber and gutta percha, goloshes and rubber boots, transmission belting, waterproof stuffs of any vegetable textiles and for any purpose, and auto trucks, but not automobiles without the permission of the Department of Social Insurance.

LETTLAND.

Lettland, by the tariff law of March 26-April 2, 1919, will exact ad valorem customs duties of 5 per cent on crude gum and asbestos, and 10 per cent on rubber goods.

THE NETHERLANDS.

The prohibitions have been withdrawn against the exportation from the Netherlands of rubber, waste rubber, rubber, and gutta percha and articles manufactured therefrom, with the exception of motor and cycle tires and dental rubber.

SPAIN.

The export prohibition on manufactures of rubber, imposed by an order of April 24, 1915, has been removed by the Spanish Government, but the export of crude rubber and similar materials remains prohibited. Crude rubber is being imported without difficulties and it is believed that the export of rubber manufactures should be encouraged.

JAPAN.

The export prohibition on crude rubber and rubber manufactures in Japan has been removed.

BRAZIL.

In Brazil the separate states impose export duties. The State of Bahia now exacts 9 per cent ad valorem on exports of Mangabeira and Maniçoba rubber.

GERMANY.

Germany has recently established a free import list, articles included in which may be imported without license. Among these are: rubber, raw or purified; gutta percha, raw or purified; balata, raw or purified; rubber, gutta percha and balata scrap; worn out pieces of rubber; gutta percha and balata articles; asbestos fiber and refined asbestos; raw and ground abestos.

CZECHO-SLOVAKIA.

Czecho-Slovakia grants general licenses for the importation of crude rubber and of rubber and vulcanite goods, technical and surgical. The country is in urgent need of pneumatic tires, fire hose and other rubber goods.

ALUM PROHIBITED AS COAGULANT.

Alum is forbidden as a coagulant of rubber latex by the administrative officers of Perak, Selangor, Negri Sembilan and Pekang in the Federated Malay States. The regulation reads:

Salts of alum and other aluminum salts shall not be used for the coagulation of *Hevea* latex or for the preparation of rubber therefrom either alone or in admixture with each other or in combination with any other substance or substances.

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